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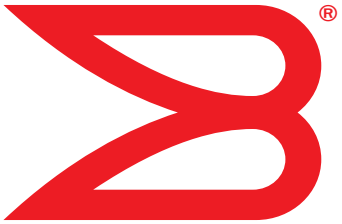
*18 February 2011*



# Brocade FastIron LS and LS-STK

## Hardware Installation Guide

**Supporting Release 07.2.02**

BROCADE

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# Contents


**About This Document**

Audience . . . . . vii
Supported hardware and software . . . . . vii
Document conventions . . . . . vii
Text formatting . . . . . vii
Command syntax conventions . . . . . viii
Notes, cautions, and danger notices . . . . . viii
Notice to the reader . . . . . viii
Related publications . . . . . ix
Getting technical help or reporting errors . . . . . ix
Web access . . . . . ix
E-mail and telephone access . . . . . ix

**Chapter 1 Product Overview**

Hardware features . . . . . 1
FLS624, FLS648, FLS624-STK, FLS648-STK . . . . . 1
Control features . . . . . 2
Fiber optic modules . . . . . 7
Power supplies . . . . . 7

**Chapter 2 Installing an FLS or FLS-STK device**

Unpacking a system . . . . . 9
Package contents for standalone FLS devices . . . . . 9
Package contents for FLS-STK devices . . . . . 9
General requirements . . . . . 10
Summary of installation tasks . . . . . 10
Installation precautions . . . . . 11
General precautions . . . . . 11
Lifting precautions . . . . . 12
Power precautions . . . . . 12
Preparing the installation site . . . . . 13
Cabling infrastructure . . . . . 13
Installation location . . . . . 13
Installing the device . . . . . 13
Desktop installation . . . . . 14
Rack mount installation . . . . . 14
Connecting devices in a stack . . . . . 15

Installing a redundant power supply . . . . . 17
About the RPS2-EIF redundant power supply . . . . . 17
Installing a redundant power supply . . . . . 19
Installation . . . . . 19
Selecting a site . . . . . 19
Equipment checklist . . . . . 20
Mounting . . . . . 20
Connecting devices to the redundant power supply . . . . . 22
Ports pin-out (RPS2-EIF) . . . . . 24
Installing an optional module in the device . . . . . 25
Installing an SFP transceiver . . . . . 26
Powering on the system . . . . . 26
Verifying proper operation . . . . . 27
Attaching a PC or terminal . . . . . 27
Wiring map for serial cable . . . . . 28

**Chapter 3 Stacking EEPROM and Memory Upgrade for FastIron LS Series Devices**

Upgrade kit contents . . . . . 29
Upgrading hardware . . . . . 29
Upgrading software . . . . . 35

**Chapter 4 Connecting Network Devices and Checking Connectivity**

Assigning permanent passwords . . . . . 37
Recovering from a lost password . . . . . 38
Configuring IP addresses . . . . . 39
Devices running layer 2 software . . . . . 39
Devices running base layer 3 software . . . . . 40
Assigning an IP address to an Ethernet port . . . . . 40
Connecting network devices . . . . . 42
Connectors . . . . . 42
Cable specifications . . . . . 42
Connecting to Ethernet or fast Ethernet hubs . . . . . 42
Connecting to workstations, servers, or routers . . . . . 43
Connecting a network device to a fiber port . . . . . 44
Testing connectivity . . . . . 46
Observing LEDs . . . . . 46
Troubleshooting network connections . . . . . 46

**Chapter 5 Maintaining the FLS and FLS-STK Hardware**

Managing FastIron LS temperature settings . . . . . 49
Using the temperature sensor . . . . . 49
Displaying the temperature . . . . . 49
Changing the temperature warning and shutdown levels . . . . 51
Changing the device temperature polling interval . . . . . 52

Displaying FastIron LS CPU usage . . . . . 52
Hardware maintenance schedule . . . . . 53
Installing or replacing a 10 Gbps Ethernet module . . . . . 53
Installing an optional module in the device . . . . . 53
Removing a 10 Gbps Ethernet module . . . . . 54
Replacing a fiber optic module . . . . . 54
Installing a new fiber optic module . . . . . 55
Cabling a fiber optic module . . . . . 55
Cleaning the fiber optic connectors . . . . . 56
Digital optical monitoring . . . . . 56

**Chapter 6 Troubleshooting**

Diagnosing device indicators . . . . . 57
Power and cooling problems . . . . . 57
Installation . . . . . 57
In-band access . . . . . 58

**Chapter 7 Hardware Specifications**

FastIron LS and LS-STK specifications . . . . . 59
Physical dimensions . . . . . 59
Environmental considerations . . . . . 59
Cooling . . . . . 61
Regulatory compliance . . . . . 62
Warranty . . . . . 63
Pinouts and signaling . . . . . 63
Cable specifications . . . . . 64
AC power supply . . . . . 66
Power cables . . . . . 66
Redundant power supply specifications . . . . . 66
Key features . . . . . 67
Physical dimensions and weight . . . . . 67
Input connector specifications . . . . . 67
Regulatory compliance . . . . . 67

**Appendix A Regulatory Statements**

USA (FCC CFR 47 Part 15 Warning) . . . . . 71
Industry Canada statement . . . . . 71
Europe and Australia (CISPR 22 Class A Warning) . . . . . 71
Japan (VCCI) . . . . . 71
Japan power cord . . . . . 72
Korea . . . . . 72
Russia . . . . . 72
Regulatory compliance . . . . . 73

**Appendix B Caution and Danger Notices**

Caution . . . . . 75
Danger . . . . . 81

# About This Document

## Audience

This document is designed for system administrators with a working knowledge of Layer 2 and Layer 3 switching and routing.

If you are using a Brocade Layer 3 device, you should be familiar with the following protocols if applicable to your network – IP, RIP, OSPF, BGP, ISIS, IGMP, PIM, DVMRP, and VRRP.

## Supported hardware and software

Although many different software and hardware configurations are tested and supported by Brocade Communications Systems, Inc., documenting all possible configurations and scenarios is beyond the scope of this document.

The following hardware platforms are supported by this release of this guide:

- FLS 624 with option for up to three 1-port 10 Gbps Ethernet modules
- FLS 648 with option for up to two 1-port 10 Gbps Ethernet modules
- FLS 624-STK stackable device with option for up to three 1-port 10 Gbps Ethernet modules
- FLS 648-STK stackable device with option for up to two 1-port 10 Gbps Ethernet modules

## Document conventions

### Text formatting

The narrative-text formatting conventions that are used are listed below.

| | |
|---|---|
| **bold** text | Identifies command names<br>Identifies the names of user-manipulated GUI elements<br>Identifies keywords<br>Identifies text to enter at the GUI or CLI |
| *italic* text | Provides emphasis<br>Identifies variables<br>Identifies document titles |
| `code` text | Identifies CLI output |

Command lettercase is usually all lowercase. This manual specifically notes cases where a command is case sensitive.

## Command syntax conventions

Command syntax in this manual follows these conventions:

| | |
|---|---|
| **command and parameters** | Commands and parameters are printed in bold. |
| [ ] | Optional parameter. |
| *variable* | Variables are printed in italics enclosed in angled brackets < >. |
| **...** | Repeat the previous element, for example “member[;member...]” |
| \| | Choose from one of the parameters. |

## Notes, cautions, and danger notices

The following notices and statements are used in this manual. They are listed below in order of increasing severity of potential hazards.

**NOTE**
A note provides a tip, guidance or advice, emphasizes important information, or provides a reference to related information.

**CAUTION**

**A Caution statement alerts you to situations that can be potentially hazardous to you or cause damage to hardware, firmware, software, or data.**

**DANGER**

***A Danger statement indicates conditions or situations that can be potentially lethal or extremely hazardous to you. Safety labels are also attached directly to products to warn of these conditions or situations.***

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| Phillips Screw Company, Inc | Phillips |

# Related publications

The following Brocade documents supplement the information in this guide:

- *FastIron Configuration Guide*
- *IronWare MIB Reference*

**NOTE**
For the latest edition of these documents, which contain the most up-to-date information, see Product Manuals at kp.foundrynet.com.

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Go to http://www.brocade.com/services-support/index.page for the latest e-mail and telephone contact information.

Chapter

# Product Overview

1

## Hardware features

The FastIron LS and LS-STK Series includes the following models:

- FastIron LS 624 with option for up to three 1-port 10 Gbps Ethernet modules
- FastIron LS 648 with option for up to two 1-port 10 Gbps Ethernet modules
- FastIron LS 624-STK stackable device with option for up to three 1-port 10 Gbps Ethernet modules
- FastIron LS 648-STK stackable device with option for up to two 1-port 10 Gbps Ethernet modules

All models support an optional external redundant AC power supply that can power up to four units.

The following sections describe the physical characteristics of the FastIron LS and LS-STK models. For more details about physical dimensions, power supply specifications, and pinouts, see Chapter 7, “Hardware Specifications”.

### FLS624, FLS648, FLS624-STK, FLS648-STK

FastIron LS and LS-STK devices provide high 10/100/1000 Mbps RJ45 port density and 10 Gbps Ethernet uplinks in a compact form factor:

- The FLS624 has 20 10/100/1000 Mbps RJ45 ports and four 100/1000 SFP slots, a front panel slot for an optional 10 Gbps CX4 module, two rear-panel 10 Gbps uplink module slots, and a redundant power socket.
- The FLS648 has 44 10/100/1000 Mbps RJ45 ports and four 100/1000 SFP slots, two rear-panel 10 Gbps uplink module slots, and a redundant power socket.
- The FLS624-STK has 20 10/100/1000 Mbps RJ45 ports and four 100/1000 SFP slots, one front-panel slot for an optional 10 Gbps CX4 module, two rear-panel 10 Gbps uplink modules and a redundant power socket.
- The FLS648-STK has 44 10/100/1000 Mbps RJ45 ports and four Gbps SFP slots, two rear-panel 10 Gbps uplink module slots, and a redundant power socket.

The following figures show the front and rear panels of the FastIron LS and LS -STK models.

**FIGURE 1 FastIron LS 624 and FastIron LS 624-STK front panel**

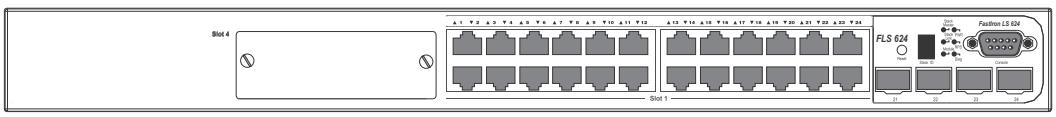


**FIGURE 2** FastIron LS 648 and FastIron LS 648-STK front panel

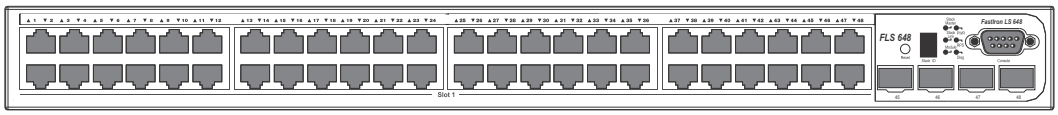



**FIGURE 3** FastIron LS 624 and 648 rear panel

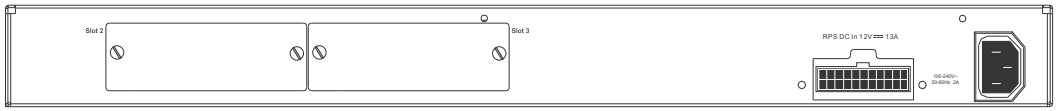



**FIGURE 4** FastIron LS 624 or FastIron LS 624-STK front panel with optional module installed

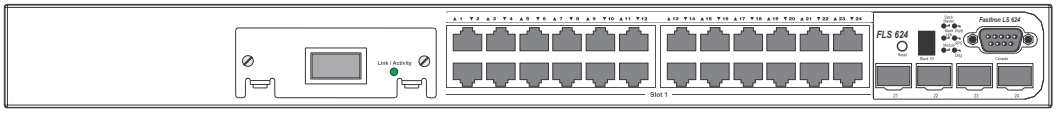
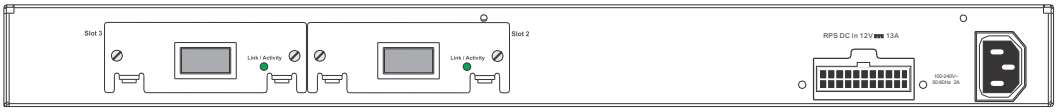



**FIGURE 5** FastIron LS 624-STK and FastIron LS 648-STK rear panel




## Control features

The front panel on each device includes the following control features:

- Serial management interface (the port labeled **Console**)
- Reset button

### *Serial management interface (Console port)*

The serial management interface allows you to configure and manage the device using a third-party terminal emulation application on a directly connected PC. A straight-through EIA or TIA DB-9 serial cable (M or F) ships with the device. The serial management interface (the Console port) is located in the right corner of the front panel.

### *Reset button*

The reset button allows you to restart the system without removing power or using the CLI or Web Management Interface. The button is located to the left of the serial management interface and is recessed to prevent it from being pushed accidentally.

### *FastIron LS and LS-STK network interfaces*

FLS and FLS-STK devices provide the following interfaces:

- 10/100/1000 Mbps ports with RJ45 copper connectors
- 100/1000 Mbps ports with mini-GBIC slots for SFP MSA-compliant fiber transceivers

- Optional 10 Gbps uplink modules (not available for FastIron LS 648-STK models)

For information about the type of fiber optic modules supported, see "Fiber optic modules" on page 7.

### FastIron LS and LS-STK 10/100/1000BASE-T ports

FLS and FLS-STK devicees contain 24 or 48 ports that operate at 10 Mbps or 100 Mbps, half or full duplex, or at 1000 Mbps, full duplex. Because all ports on these devicees support automatic MDI/MDI-X operation, you can use straight-through cables for all network connections to PCs or servers, or to other devicees or hubs. (Refer to "Pinouts and signaling" on page 63.) It is best to use MDIX cable for device-to-device connections.

Each of these ports support auto-negotiation, so the optimum transmission mode (half or full duplex), and data rate (10, 100, or 1000 Mbps) can be selected automatically. If a device connected to one of these ports does not support auto-negotiation, the communication mode of that port can be configured manually.

## *Network interfaces*

Table 1 describes the network interfaces supported on FastIron LS devices.

**TABLE 1** Supported network interfaces

| Interface | Show media description |
|---|---|
| 1000Base-BX-D | M-GBXD |
| 1000Base-BX-U | M-GBXU |
| 1000Base-LHA | M-LHA |
| 1000Base-LHB | M-LHB |
| 1000Base-LX | M-LX |
| 1000Base-SX | M-SX |
| 1000Base-SX2 | M-SX2 |
| 1000Base-T | C |
| 100Base-BX | M-FBX |
| 100Base-FX | M-FX |
| 10GBase-CX4 | XG-ER |
| 10GBase-CX4 (XFP) | XG-ER |
| 10GBase-ER | XG-ER |
| 10GBase-LR | XG-LR |
| 10GBase-LRM | XG-LRM |
| 10GBase-SR | XG-SR |
| 10GBase-ZR | XG-ZR |
| 10GBase-ZRD | XG-ZRD |
| 1310-MMF 10GbE | 1310-NM |

### *10 Gbps Ethernet module slots for standalone devices*

FLS 624 and FLS 648 standalone devices include two slots on the rear panel for single-port 10GBASE uplink modules with XFP transceivers, and a single port CX4 module. The 10GBASE transceivers operate at 10 Gbps full duplex with support for asymmetric flow control (that is, the port honors incoming pause frames, but does not originate pause frames).

### *10 Gbps Ethernet module slots for stacking devices*

FLS 624-STK and FLS 648-STK devices include two 10 Gbps Ethernet CX4 modules on the rear panel (the stacking ports). The FLS 624-STK has an additional slot on the front panel that supports an optional 10 Gbps CX4 module.

#### 10 Gbps CX4 ports

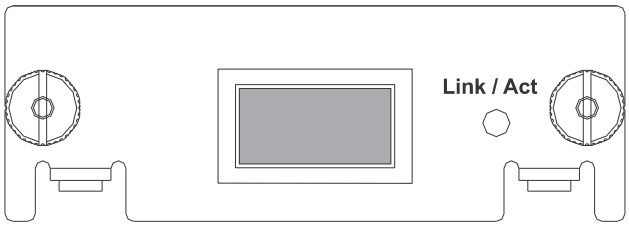
The single-port CX4 module is installed in the FLS 624 and FLS 648 (shown in Figure 6). You can order the FastIron LS with a single-port CX4 module pre-installed, or you can upgrade your device at a later time. This module is a 10 GbE-CX4 Ethernet uplink card, capable of performing data transmission directly through copper links to 15m (extended 30m) in length.

Single-port CX4 uplink for 10 Gbps is supported.

Link and Activity LEDs on the module faceplates indicate operational status:

- If the Link LED is on, the port is connected. If the Link LED is off, no connection exists, or the link is down.
- If the Act LED is on or blinking, traffic is being transmitted and received on the port. If the Act LED is off, no traffic is being transmitted or received on the port.

**FIGURE 6 Single-port 10 Gbps Ethernet CX4 module**




#### Cable specifications

The following cable specifications apply to the CX4 port in the 10GbE interface module (FLS-1XGC):

- Support for 802.3ak or 10 Gbps Ethernet CX4 standard
- Support for cables up to 15m in length
- Requires latch-style receptacle or SFF-8470 plug
- Recommended CX4 cable is manufactured by WL Gore, part number IBN6600-15, CX4 Assembly - 26AWG SPC 15.0m

**NOTE**
The recommended CX4 cable can also be used with a Small Form Factor Pluggable (XFP) MSA-compliant optical transceiver (part number FLS-1XGC).

Figure 7 shows the CX4-grade cable.

**FIGURE 7** CX4 transceiver cable

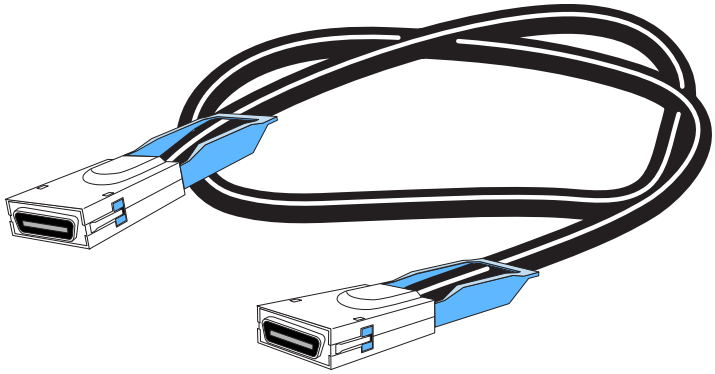
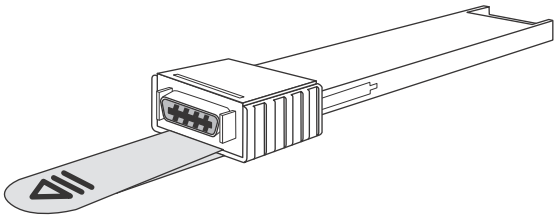


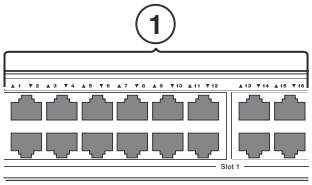
**FIGURE 8** CX4 slide-in transceiver



## *Port, system, and module status LEDs*

FastIron LS and LS-STK devices include key system and port indicators to simplify installation and network troubleshooting. These LEDs, located on the front panel for easy viewing, are shown in Figure 9 and described in the following tables.

**FIGURE 9** Port status LEDs

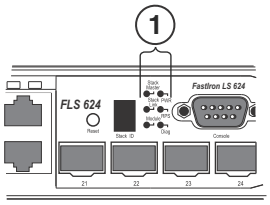



1 Port status LED

**TABLE 2** Port status LEDs

| LED | Status | Status |
|---|---|---|
| Link/ Activity or Speed | On or Flashing Amber | Port has a valid link at 10 or 100 Mbps. Flashing indicates activity. |
| | On or Flashing Green | Port has a valid link at 1000 Mbps. Flashing indicates activity. |
| | Off | The link is down. |

**FIGURE 10** System status LEDs

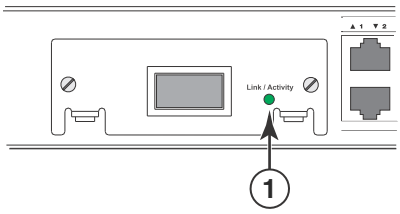



1 System status LED

**TABLE 3** System status LEDs

| LED | Condition | Status |
|---|---|---|
| Power | Green | Internal power is operating normally. |
| | Amber | Internal power supply failure. |
| | Off | Power off or failure. |
| Diag | Green | System self-diagnostic test successfully completed. |
| | Amber | System self-diagnostic test has detected a fault. |
| RPS | Green | Redundant power supply is providing power. |
| | Amber | Primary power supply is active, RPS is on standby. |
| | Off | Redundant power supply is off or not plugged in. |
| Stack Active controller | Green | Device is the Active Controller of the stack. State may include topology discovery, IP assignment, or normal operations. |
| | Flashing Green | Device is the Active Controller of the stack, system is initializing. |
| | Amber | Device is operating as a Standby Controller in the stack. |
| | Flashing Amber | System in Active Controller arbitration or election state. |
| | Off | System in standalone mode. |
| Stack Link | Green | Uplink and downlink operating normally. |
| | Flashing Green | Uplink has failed. |
| | Flashing Amber | Downlink has failed. |
| | Off | No stacking link present. |
| Module | Green | An expansion module is installed and operating normally. |
| | Amber | An expansion module is installed but has failed. |
| | Off | There is no module installed. |
| Stack ID | 1-8 | Indicates the device stack ID.<br>The Active Controller is numbered 1. (Note that If the Active Controller fails and a backup unit takes over, the stack IDs do not change.)<br>The Standby Controller is numbered 2. The remaining stack members are numbered 3-8. |
| | 0 | A standalone device. A device with a stack ID of 0 cannot act as part of a stack. |

**FIGURE 11** Module Link/Activity LED




1 Link/Activity LED

**TABLE 4** Module Link/Activity LED

| LED | Condition | Status |
|---|---|---|
| Link or Activity | On | Port has a valid link at 10 Gbps. |
| | On or Flashing Green | Flashing indicates activity. |
| | Off | The link is down. |

## Fiber optic modules

A list of the types of fiber optic modules supported on Layer 2 Compact devicees can be found in "Cable specifications" on page 64

**NOTE**
Some older SFP modules (mini-GBICs for Gbps Ethernet ports) have latching mechanisms that are larger than the newer parts. These latches could interfere with one another when inserted side by side in the same module. These older modules are identified by the number PL-XPL-00-S13-22 or PL-XPL-00-L13-23 above the serial number. All newer mini-GBICs do not have this limitation.

DANGER
*All fiber optic interfaces use Class 1 lasers.*

## Power supplies

There are two power receptacles on the rear panel of each device. The standard power receptacle is for the AC power cable. The receptacle labeled "RPS" is for the optional redundant power supply.

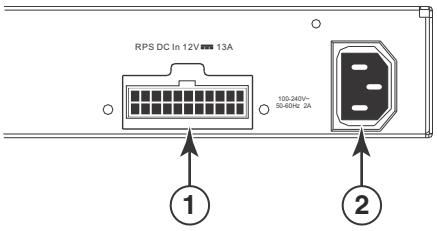
### *Optional redundant power supply*

The device supports an optional redundant power supply (RPS), that can supply power in the event the internal power supply fails.

### *Power supply receptacles*

There are two power receptacles on the rear panel of each device. The standard power receptacle is for the AC power cable. The receptacle labeled "RPS" is for the optional redundant power supply.

**FIGURE 12 Power supply receptacles**




1 Redundant Power Socket

2 Power Socket

Chapter

# 2

# Installing an FLS or FLS-STK device

## Unpacking a system

DANGER

*The procedures in this manual are intended for qualified service personnel.*

This chapter describes how to physically install a FastIron LS or FastIron LS-STK device.

For information about configuring IP addresses and connecting network devices, see Chapter 4, "Connecting Network Devices and Checking Connectivity".

For information about configuring an IronStack using FLS624-STK and FLS648-STK devices, see the *FastIron Configuration Guide*.

Brocade FLS and FLS-STK devices ship with all of the items listed below. Please review this list and verify the contents of your shipping container. If any items are missing, please contact the place of purchase.

FLS624-STK and FLS648-STK devices come with a 0.5 meter 10GBASE CX4 cable.

### Package contents for standalone FLS devices

Package contents for standalone FLS devices include:

- FastIron LS device
- 115V AC power cable (for AC devices)
- Rack mount brackets
- Warranty card

### Package contents for FLS-STK devices

Package contents for FLS-STK devices included:

- FastIron LS-STK device
- 115V AC power cable (for AC devices)
- Rack mount brackets
- Warranty card
- 10GBASE CX4 (FLS624-STK only)
- 0.5m CX4 cable

## General requirements

To manage the system through a serial connection, you will need the following items:

- A management station, such as a PC running a terminal emulation application.
- A straight-through EIA or TIA DB-9 serial cable (F/F). The serial cable can be ordered separately from Brocade. If you prefer build your own cable, see the pinout information in "Attaching a PC or terminal" on page 27.

Use the serial connection to perform basic configuration tasks, including assigning an IP address and network mask to the system. This information is required to manage the system using the Web management interface or IronView or using the CLI through Telnet.

# Summary of installation tasks

Follow the steps listed below to install your FastIron LS or LS-STK device. Details for each step are provided in this chapter and in the following chapter.

**TABLE 5** Installation tasks

| Task number | Task | Where to find more information |
|---|---|---|
| 1 | Ensure that the physical environment that will host the device has the proper cabling and ventilation. | "Preparing the installation site" on page 13 |
| 2 | Install any required optional modules into the device. | "Installing an optional module in the device" on page 25 |
| 3 | Install the Brocade device on a desktop, in an equipment rack. | "Installing the device" on page 13 |
| 4 | Connect stackable devices in an IronStack topology. | "Connecting devices in a stack" on page 15 |
| 5 | Once the device is physically installed, plug the device into a nearby power source that adheres to the regulatory requirements outlined in this manual. | "Powering on the system" on page 26 |
| 6 | Verify that the system LEDs are registering the proper LED state after power-on of the system. | "Verifying proper operation" on page 27 |
| 7 | Attach a terminal or PC to the Brocade device. This will enable you to configure the device through the Command Line Interface (CLI). | "Attaching a PC or terminal" on page 27 |
| 8 | No default password is assigned to the CLI. For additional access security, assign a password. | "Assigning permanent passwords" on page 37 |
| 9 | Before attaching equipment to the device, you need to configure an interface IP address to the subnet on which it will be located. Initial IP address configuration is performed using the CLI with a direct serial connection. Subsequent IP address configuration can be performed using the Web management interface. | "Configuring IP addresses" on page 39 |
| 10 | Once you power on the device and assign IP addresses, the system is ready to accept network equipment. | "Devices running base layer 3 software" on page 40 |

**TABLE 5** Installation tasks (Continued)

| Task number | Task | Where to find more information |
|---|---|---|
| 11 | Test IP connectivity to other devices by pinging them and tracing routes. | "Testing connectivity" on page 46 |
| 12 | Continue configuring the device using the CLI or the Web management interface. You also can use IronView to manage the device. Refer to the *IronView Network Manager User Guide* for information. | *FastIron Configuration Guide* |
| 13 | Secure access to the device. | *FastIron Configuration Guide* |

# Installation precautions

Follow these precautions when installing a Brocade device.

## General precautions

DANGER

***All fiber optic interfaces use Class 1 lasers.***

CAUTION

**Do not install the device in an environment where the operating ambient temperature might exceed 50$^{O}$ C (121$^{O}$ F).**

CAUTION

**Make sure the air flow around the front and sides of the device is not restricted.**

CAUTION

**Never leave tools inside the device.**

## Lifting precautions

DANGER

*Make sure the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable or falling over.*

DANGER

*Mount the devices in the lowest possible slots in a rack or cabinet. Place the heaviest device at the bottom and progressively place lighter devices above.*

## Power precautions

CAUTION

Use a separate branch circuit for each AC power cable, which provides redundancy in case one of the circuits fails.

CAUTION

To avoid high voltage shock, do not open the device while the power is on.

CAUTION

Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the device. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the devices near the input power connectors.

DANGER

*Disconnect the power cable from all power sources to completely remove power from the device.*

DANGER

*If the installation requires a different power cable than the one supplied with the device, make sure you use a power cable displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cable can be used safely with the device.*

# Preparing the installation site

## Cabling infrastructure

Ensure that the proper cabling is installed at the site. Refer to Chapter 7, "Hardware Specifications" or visit *www.brocade.com* for a summary of supported cabling types and their specifications.

## Installation location

Before installing the device, plan the location and orientation relative to other devices and equipment. Devices can be mounted in a standard 19-inch equipment rack or on a flat surface. Be sure to follow the guidelines below when choosing a location.

The site should:

- Maintain temperatures within 0 to 50$^{O}$C (32 to 122$^{O}$F) and humidity levels within 5% to 95%, non-condensing.
- Allow a minimum of 3 inches of space between the sides and the back of the device and walls or other obstructions for proper air flow.
- Allow at least 3 inches of space at the front and back of the device for the twisted pair, fiber optic, and power cables.
- Be accessible for installing, cabling, and maintaining the devices.
- Allow the status LEDs to be clearly visible.
- Allow twisted pair cable to always be routed away from power lines, fluorescent lighting fixtures, and other sources of electrical interference, such as radios and transmitters.
- Allow the device to be connected to a separate grounded power outlet that provides 100 to 240 VAC, 50 to 60 Hz, is within 2 meters (6.6 feet) of each device and is powered from an independent circuit breaker. As with any equipment, a filter or surge suppressor is recommended.

## Installing the device

You can install Brocade devices on a desktop or in an equipment rack.

DANGER

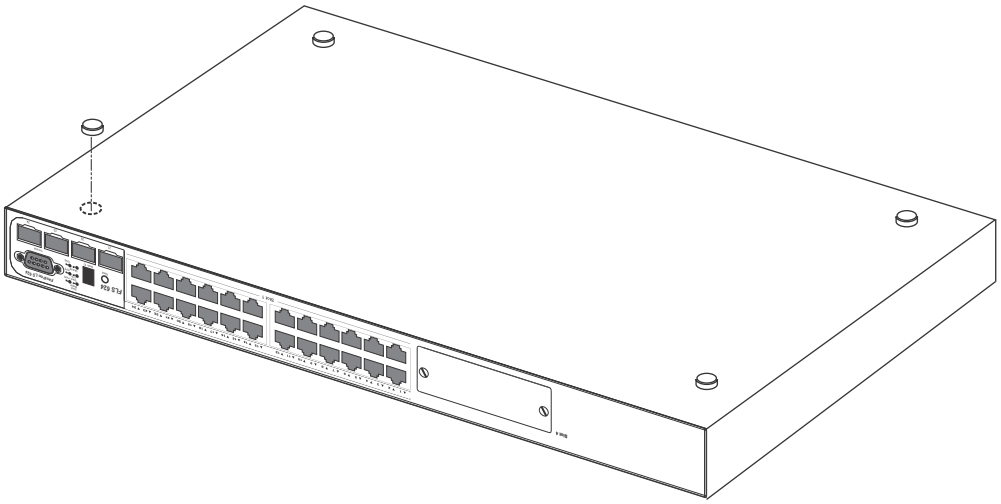
***Make sure the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable or falling over.***

DANGER

***Mount the devices in the lowest possible slots in a rack or cabinet. Place the heaviest device at the bottom and progressively place lighter devices above.***

## Desktop installation

**FIGURE 13 Attaching the adhesive feet**



1. Attach the four adhesive feet to the bottom of the first device.
2. Set the device on a flat desktop, table, or shelf near an AC power source. Make sure that adequate ventilation is provided for the system – a 3 inch clearance is recommended on each side.
3. If you are installing a single device, go to "Powering on the system" on page 26.
4. If you are installing multiple devicees, attach the adhesive feet to each device. Place each device squarely on top of the one below, in any order.
5. If you are also installing a redundant power supply, place it close to the device.

## Rack mount installation

**NOTE**
You need a #2 Phillips screwdriver for installation.

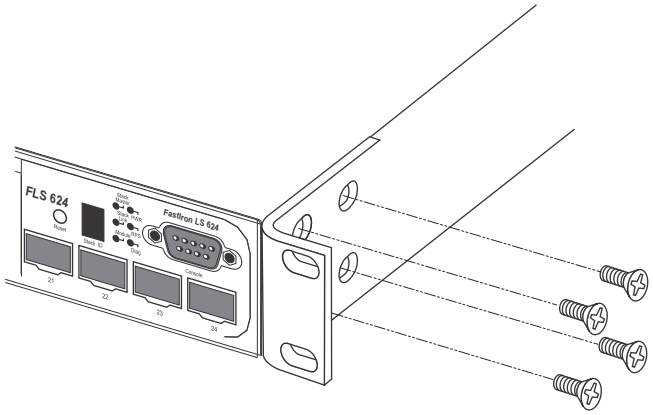
Before mounting the device in a rack, pay particular attention to the following factors:

- **Temperature:** Since the temperature inside a rack assembly may be higher than the ambient room temperature, make sure the rack-environment temperature is within the specified operating temperature range. (Refer to "Operating environment" on page 60.)
- **Mechanical loading**: Do not place any equipment on top of a rack-mounted unit.
- **Circuit overloading**: Be sure that the supply circuit to the rack assembly is not overloaded.
- **Grounding**: Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

Follow the steps below to mount devices in rack.

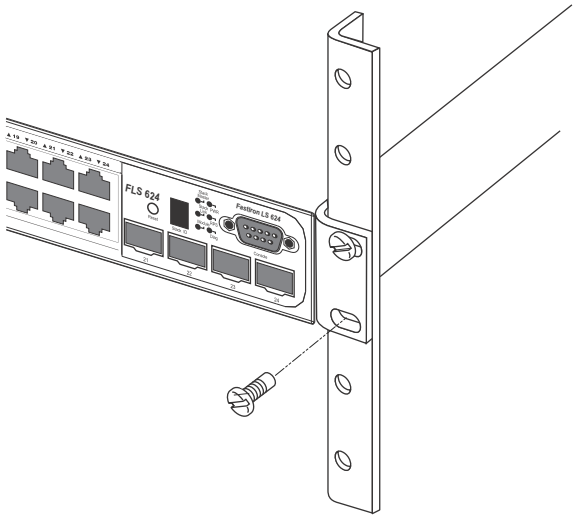
1. Remove the rack mount kit from the shipping carton. The kit contains two L-shaped mounting brackets and mounting screws.
2. Attach the mounting brackets to the sides of the device as illustrated in Figure 14.

**FIGURE 14 Attaching the brackets**




3. Attach the device in the rack as illustrated in Figure 15.

**FIGURE 15 Installing the device in a rack**




4. If you are installing a single device, proceed to "Powering on the system" on page 26.
5. If you are installing multiple devices, mount them in the rack, one below the other, in any order.
6. If you are also installing a redundant power supply, mount it in the rack below the other devices.

## Connecting devices in a stack

Figure 16 shows how the stack cables are connected between devices in a stack. The connection is based on 10 Gbps Ethernet, using CX4 cables. FLS-STK devices support linear and ring stack topologies, and can also operate as standalone devices. For detailed information about configuring and managing an IronStack, see the *FastIron Configuration Guide*.

In a **linear** stack topology there is a single stack cable connection between each device that carries two-way communications across the stack. In a **ring** stack topology, an extra cable is connected between the top and bottom devices forming a “ring” or “closed-loop.” The closed-loop cable provides a redundant path for the stack link, so if one link fails, stack communications can be maintained.

You can build a stack containing up to 8 FastIron LS-STK units. Follow the steps below to connect devices in a stack.

1. Plug one end of a stack cable into one of the CX4 stacking ports of the top unit.
2. Plug the other end of the stack cable into one of the stacking ports of the next unit.
3. Repeat steps 1 and 2 for each unit in the stack. Form a simple chain starting with a stacking port on the top unit and ending at a stacking port on the bottom unit (stacking up to 8 units).
4. (Optional) To form a ring stack topology, plug one end of a stack cable into the remaining stacking port on the bottom unit and the other end into the remaining stacking port on the top unit.

   Use the .5 meter CX4 cables that shipped with each FLS-STK device to connect a linear stack topology. For a ring topology, you will need an additional, longer (3.0 meter) CX4 cable.

**NOTE**
The total maximum stacking distance in linear and ring stack topologies is 1,000 meters (3,281 feet). This length can consist of multiple inter-device stacking connections adding up to 1,000 meters. A single inter-device stacking connection should not exceed 1,000 meters.

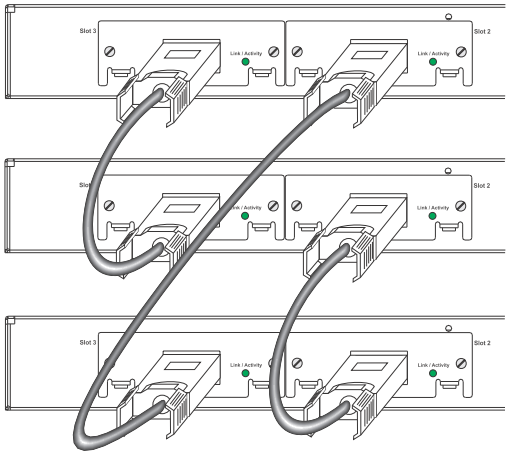
Table 6 lists the recommended cable lengths for XFP cabling for various connection distances:

**TABLE 6** XFP optical link cable distances

| Data rate | Fiber type | Modal bandwidth @ 850nm (Mhz-km) | Worst case distance range specified (m) | Typical range (m) |
|---|---|---|---|---|
| 9.95-10.3125 Gbps | 62.5/125um MMF | 160 | 2 - 26 | |
| | 62.5/1.25um MMF | 200 | 2 - 33 | |
| | 50/125um MMF | 400 | 2 - 66 | |
| | 50/123um MMF | 500 | 2 - 82 | |
| | 50/125um MMF | 2000 | 2 - 300 | >400 |

**NOTE:** Average distance range is between 2 - 33 meters. Brocade recommends using the 2000 bandwidth version for distances greater than 80 meters.

**FIGURE 16 Connecting devicees in a ring topology stack**



One device in the stack operates as the Active Controller, one operates as the Standby Controller, with the rest of the units operating as stack members. For information about how to configure your stack, see the *FastIron Configuration Guide*.

# Installing a redundant power supply

## About the RPS2-EIF redundant power supply

The Brocade External Redundant Power Supply (RPS2-EIF) can supply a maximum of 150 Watts of output power per port, a total of 600 Watts of backup power to four FastIron devices in the event of an AC loss or failure of an internal power supply.

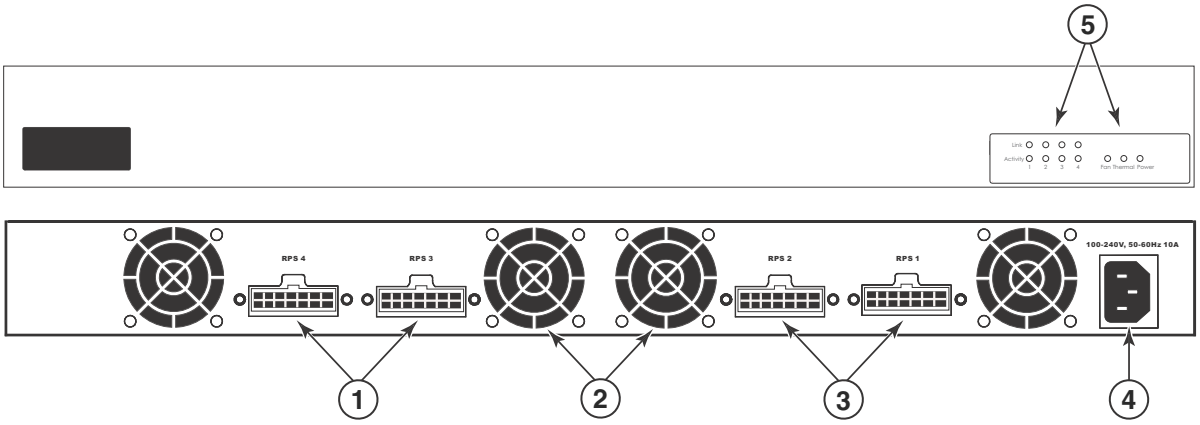
The RPS device operates as a backup to the internal power supply. If then internal power supply fails, the RPS device will support the full load of the device without affecting network operation.

FastIron LS624 and FastIron LS648 devices support the RPS2-EIF power supply.

### *Fan and power indicators and receptacles*

Four power indicators and one fan indicator are located on the front panel of the RPS device. The AC supply and DC backup receptacles are located on the RPS device rear panel.

**FIGURE 17 Front and rear panels showing fan and power indicators and power receptacles**




1 Redundant Power Sockets
2 Fans
3 Redundant Power Sockets
4 Power Socket
5 Port and System Status Indicators

### *Package contents*

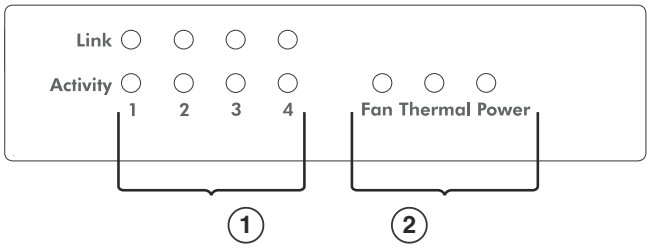
The RPS shipping package contains:

- Redundant Power Supply device (RPS2-EIF)
- One AC power cable — US, Continental Europe or UK
- Four DC backup power cords with IEC connectors on both ends (length 152 cm each)
- Rack Mounting Kit containing brackets and screws
- Adhesive feet
- User Agreement envelope
- Registration card

### *LEDs*

Figure 18 and Table 7 and Table 8 describe the functions of the RPS2-EIF LEDs.

**FIGURE 18** RPS2-EIF Status LEDs




1 Port Indicators 2 System Indicators

**TABLE 7** RPS2-EIF status LEDs

| LED (1~4) | Condition | Status |
|---|---|---|
| Link | Off | The port does not have a valid connection to a device. |
| | On Yellow | The port has a valid connection to a device. |
| | Flashing Yellow | There has been a RPS device internal power failure. |
| Activity | Off | The port is not providing power to the connected device. |
| | Flashing Green | The port has been shut down due to one of the following conditions:<br>• The system has detected an over-current condition.<br>• One or more of the fans have failed. |
| | On Green | The port is providing power to a connected device. |

**TABLE 8** RPS2-EIF power status LED

| LED | Condition | Status |
|---|---|---|
| Power | On Green | AC power is being supplied to the RPS. |
| | Off | No AC power is being supplied to the RPS device. |

# Installing a redundant power supply

## Installation

An RPS device may be placed on a desktop or mounted in a rack.

DANGER

***DO NOT place an RPS device on the floor as the case is not waterproof. It is recommended that RPS devices be installed in a network equipment rack.***

## Selecting a site

RPS2-EIF units can be mounted in a standard 19 inch equipment rack or on a flat surface. When choosing a location, follow the guidelines below:

- The site should:
  - Be at the center of all the devices you want to link and near a power outlet.
  - Maintain temperatures within 0 to 50 °C (32 to 121 °F) and humidity levels within 5% to 95%, non-condensing
  - Provide adequate space (approximately two inches) on all sides for proper air flow
  - Be accessible for installing, cabling, and maintaining the devices
  - Allow the status LEDs to be clearly visible
- Allow twisted-pair cable to always be routed away from power lines, fluorescent lighting fixtures and other sources of electrical interference, such as radios and transmitters.
- Provide a separate grounded power outlet that provides 100 to 240 VAC, 50-60 Hz, is within 2.44 m (8 feet) of each device and is powered from an independent circuit breaker. As with any equipment, Brocade recommends a filter or surge suppressor.

## Equipment checklist

After unpacking the FastIron RPS2-EIF device, check the contents to be sure you have received all the components. (See "Package contents" on page 18.) Before beginning the installation, be sure you have all other necessary installation equipment.

### *Optional rack-mounting equipment*

If you plan to rack-mount the RPS device, be sure to have the following equipment available:

- Four mounting screws for each device you plan to install in a rack, these are not included
- A screwdriver (Phillips or flathead, depending on the type of screws used)

## Mounting

FastIron RPS devices can be mounted in a standard 19 inch equipment rack or on a desktop or shelf. Mounting instructions for each type of site follow.

### *Rack mounting*

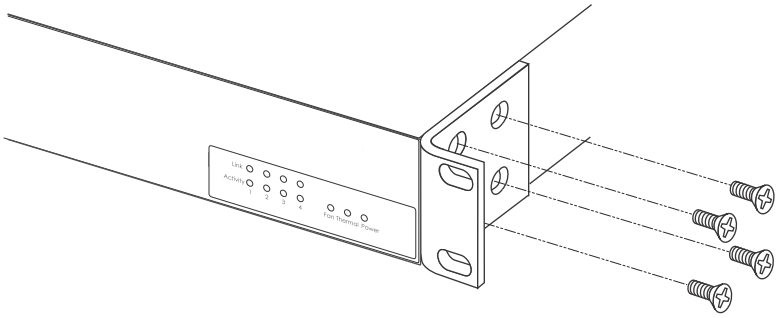
Before mounting the unit in a rack, pay particular attention to the following factors:

- **Temperature**: Since the temperature within a rack assembly may be higher than the ambient room temperature, make sure the rack-environment temperature is within the specified operating temperature range.
- **Mechanical loading**: Do not place any equipment on top of a rack-mounted unit.
- **Circuit overloading**: Make sure that the supply circuit to the rack assembly is not overloaded.
- **Grounding**: Rack-mounted equipment should be properly grounded. Particular attention should be given to supply connections other than direct connections to the mains.

Follow the steps below to mount devices in a rack.

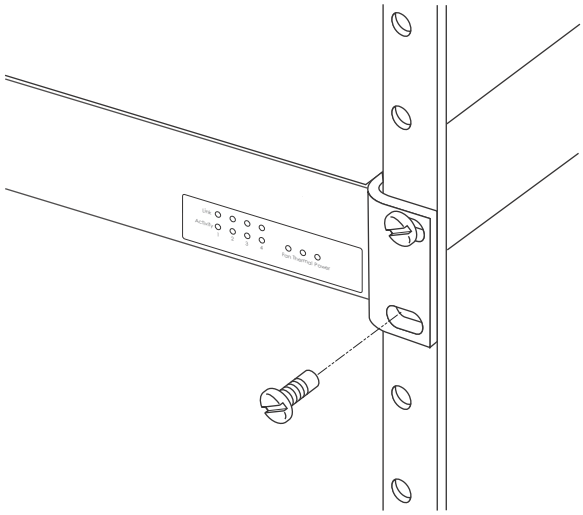
1. Attach the brackets to the device using the screws provided in the rack mounting kit.

**FIGURE 19 Attaching the brackets**



2. Mount the device in the rack, using four rack-mounting screws (not provided).

**FIGURE 20 Installing the RPS device in a rack**

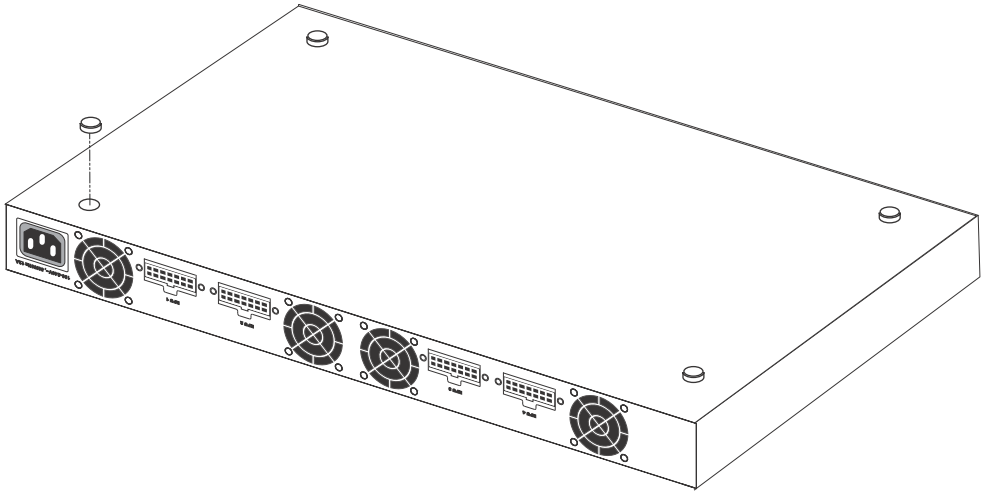


3. If installing multiple RPS devices, mount them in the rack, one below the other, in any order.

### *Desktop or shelf mounting*

1. Attach the four adhesive feet to the bottom of the first RPS device.

**FIGURE 21 Attaching the adhesive feet**



2. Set the device on a flat surface near an AC power source, making sure there are at least two inches of space on all sides for proper air flow.

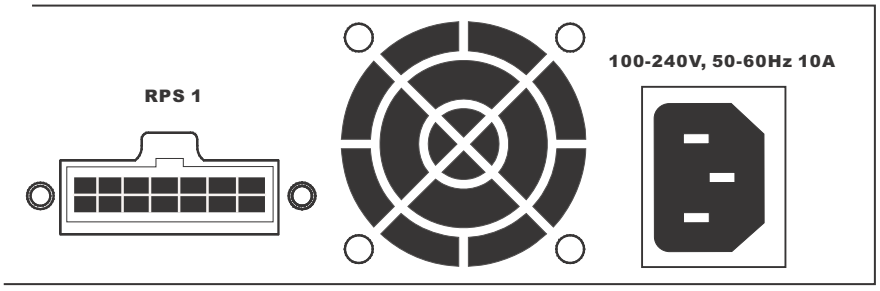
## Connecting devices to the redundant power supply

The RPS2-EIF unit can be used with all FastIron LS and FastIron LS-STK devices.

Follow the steps below to connect devices to the redundant power supply.

1. Connect one end of the AC cable to the AC receptacle on the supported device, and the other end to a grounded power outlet.

**FIGURE 22 Power receptacle**



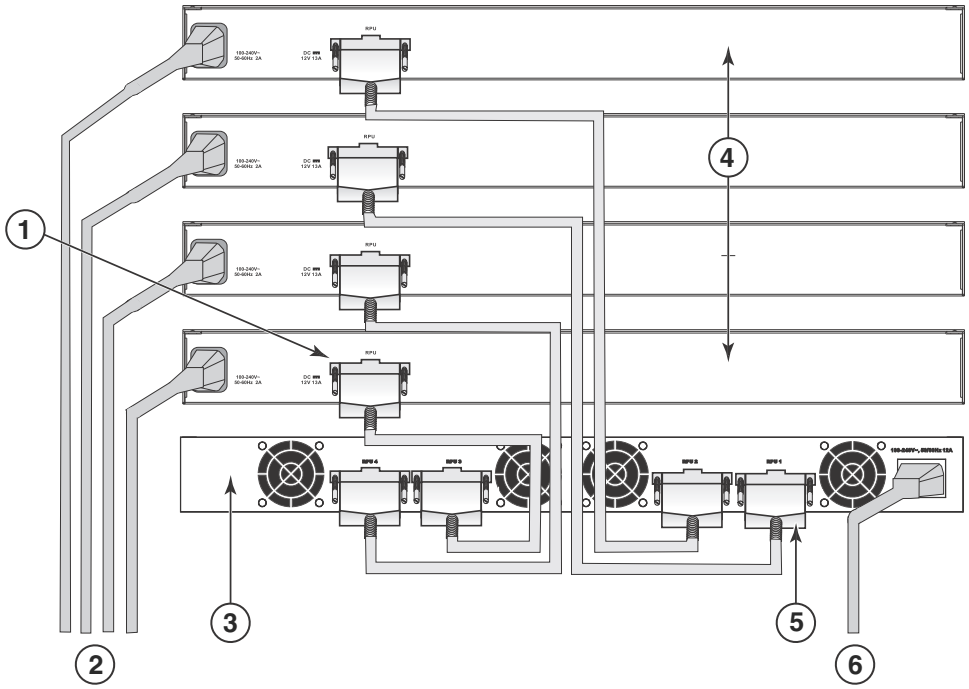

2. Connect one end of a DC cable to the redundant power receptacle on the supported device and the other end to an available receptacle on the RPS device.
3. Repeat steps 1 and 2 for connecting up to four supported devices to the RPS device.
4. Connect one end of the AC cable to the AC receptacle on the RPS device, and the other end to a grounded power outlet.

5. To connect additional RPS devices, first disconnect the original RPS device from the AC power supply, then follow steps 1, 2, 4 and 5.

**DANGER**

***Once the RPS device is disconnected from the AC power supply, the RPS device will no longer provide redundant power until after the additional RPS devices are installed, the AC power is reconnected, and the RPS device completes the self-test procedure.***

6. Check the LEDs on the RPS device to ensure proper operation. The Power LED should light up. If it does not light, see Chapter 6, "Troubleshooting" for more information.




| | | | |
|---|---|---|---|
| 1 | RPS Input Port | 4 | FLS Units |
| 2 | AC Power Supply Number 1 | 5 | RPS Output Port |
| 3 | RPS Unit | 6 | AC Power Supply Number 2 |

**NOTE**

For International use, you may need to change the AC power cable. You must use a power cable that has been approved for the receptacle type in your country.

## Ports pin-out (RPS2-EIF)

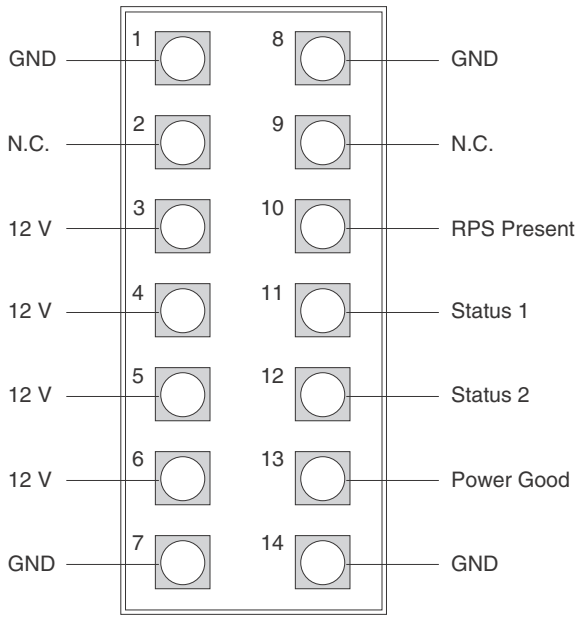
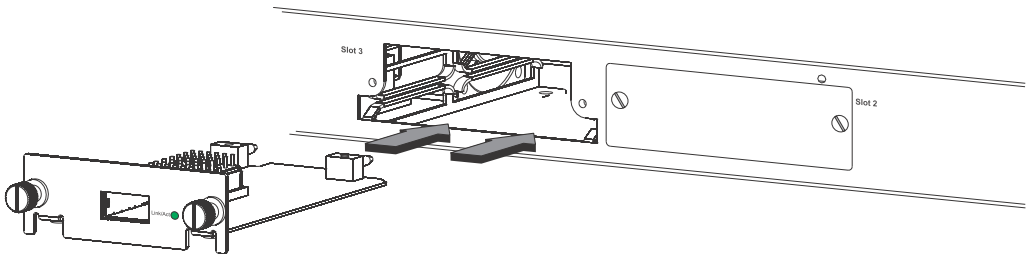



**TABLE 9** Port pin-outs - RPS2-EIF

| Pin | Name | Description |
|---|---|---|
| 1, 7, 8, 14 | GND | Ground connection |
| 2, 9 | N.C. | No current |
| 3, 4, 5, 6 | 12 V | 12 volts current |
| 10 | RPS Present | Indicates that an RPS device is attached and functioning |
| 11, 12 | Status 1, Status 2 | Status indicator |
| 13 | Power Good | Indicates that power is being supplied to the RPS device |

# Installing an optional module in the device

**FIGURE 23 Installing an optional module**




Follow the steps below to install an optional module into the device.

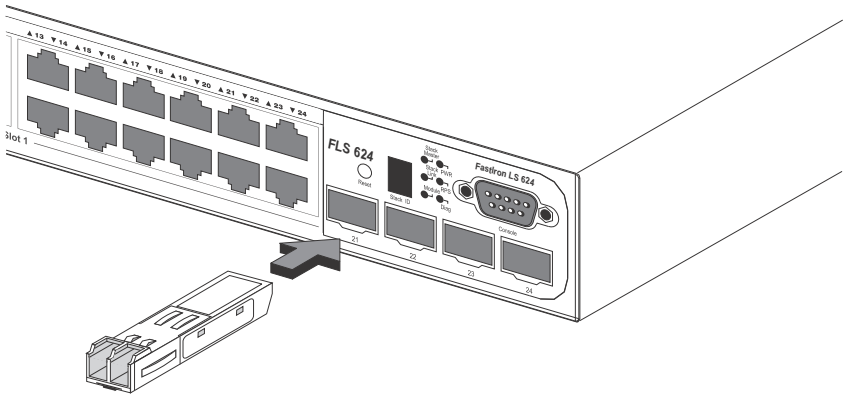
1. Remove the two mounting screws on the blank metal plate (or a previously installed module) with a flat-head screwdriver. Remove the old module, or blank plate.
2. Before opening the package that contains the new module, touch the bag to the device casing to discharge any potential static electricity. Brocade recommends using an ESD wrist strap during installation.
3. Remove the module from the anti-static shielded bag.
4. Holding the module level, guide it into the carrier rails on each side and push it into the slot, until it firmly engages with the connector.
5. When the module has properly engaged the connector, tighten the retainer screws to secure the module in the slot.
6. When the device is powered on, the module LED on the device front panel should turn green to confirm that the module is correctly installed and ready to use.

**CAUTION**

**If you do not install a module in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat.**

# Installing an SFP transceiver

**FIGURE 24 Inserting an SFP transceiver into a slot**




Follow the steps below to install an SFP transceiver.

1. Consider network and cabling requirements to select an appropriate SFP transceiver type.
2. Insert the transceiver with the optical connector facing outward and the slot connector facing down. SFP transceivers are keyed so they can only be installed in one orientation.
3. Slide the SFP transceiver into the slot until it clicks into place.

**NOTE**
SFP transceivers are hot-swappable. The device does not need to be powered off before installing or removing a transceiver. However, always first disconnect the network cable before removing a transceiver.

**NOTE**
SFP transceivers are not provided in the device package.

# Powering on the system

After you complete the physical installation of the system, you can power on the system.

1. Remove the power cable from the shipping package.
2. Attach the AC power cable to the AC connector on the rear panel.
3. Insert the power cable plug into a 115V/120V outlet.

To turn the system off, simply unplug the power cable or cables.

**NOTE**
The socket should be installed near the equipment and should be easily accessible.

**NOTE**
If the outlet is not rated 115/120V, stop and get the appropriate cable for the outlet.

# Verifying proper operation

After you have installed a redundant power supply, verify that the device is working properly by plugging it into a power source and verifying that it passes the self test.

1. Connect the power cable supplied with the device to the power connector on the power supply on the rear panel.
2. Insert the other end into a properly grounded electrical outlet.

**NOTE**
The devices do not have power switches. They power on when you connect a power cable to the device and to a power source.

If your installation requires a different power cable than that supplied with the device, make sure you obtain a power cable displaying the mark of the safety agency that defines the regulations for power cables in your country. The mark is your assurance that the power cable can be used safely with the device.

3. Verify that the LED for the power supply is green.
4. Verify proper operation by observing the LEDs:

   All of the port LEDs should flash momentarily, usually in sequence, while the device performs diagnostics. After the diagnostics are complete, the LEDs will be dark except for those that are attached by cables to other devices. If the links on these cables are good and the device has power, the link LEDs will light.

   For more details on specific LED conditions after system start-up, see the section, "LEDs" on page 18 and Chapter 7, "Hardware Specifications".

# Attaching a PC or terminal

You must assign an IP address using the Command Line Interface (CLI). You can access the CLI by attaching a serial cable to the Console port. After you assign an IP address, you can access the system through Telnet, the Web management interface, or IronView software. The CLI is described in detail in the *FastIron Configuration Guide*.

Follow these steps to attach a management station using the serial port.

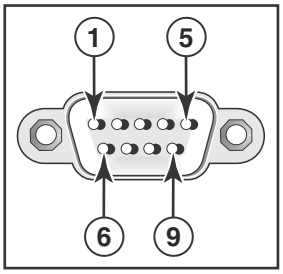
1. Connect a PC or terminal to the male DB9 connector on the system serial port using a straight-through cable.

**NOTE**
You must be able to run a terminal emulation program on the PC.

2. Open the terminal emulation program and set the following session parameters:
   - Baud: 9600 bps
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

The EIA or TIA 232 serial communication port serves as a connection point that allows management through a PC or SNMP workstation. Brocade devices come with a standard male DB-9 connector, shown in Figure 25.

**FIGURE 25** **Serial port (DB-9 DTE) pin-out**




Most PC serial ports also require a cable with a female DB-9 connector.

Terminal connections will vary, requiring either a DB-9 or DB-25 connector, male or female.

Serial cable options between a Brocade device and a PC or terminal are shown in Table 10.

## Wiring map for serial cable

**TABLE 10** Serial cable wiring

| device 9-Pin serial port | Null modem | PC 9-Pin DTE port |
|---|---|---|
| 2 RXD (receive data) | <---------- | 2 TXD (transmit data) |
| 3 TXD (transmit data) | ----------> | 3 RXD (receive data) |
| 5 SGND (signal ground) | ---------- | 5 SGND (signal ground) |
| No other pins are used. | | |

**NOTE**
As indicated in Table 10, some of the wires should not be connected.

Chapter 3

# Stacking EEPROM and Memory Upgrade for FastIron LS Series Devices

These installation instructions describe how to upgrade your FastIron LS device to support stacking.

To upgrade your device, you must replace the current 128 Mb memory with 256 Mb memory, and install the stacking EEPROM. Two upgrade kits are available. One kit includes a CX4 module for units that do not already have this module installed, and the other kit does not include a CX4 module. For more information about these kits, see Table 11.

## Upgrade kit contents

Before beginning the upgrade, verify the contents of your upgrade kit. If any items are missing, contact your place of purchase. The upgrade kits contain the following items:

**TABLE 11** Upgrade kit contents

| **Kit with CX4 module: FLS-624-STK-CXU, FLS648-STK-CXU** | **Kit without CX4 module: FLS-624-STK-U, FLS648-STK-U** |
|---|---|
| • Electrostatic Discharge (ESD) protection kit<br>• One 2-port 10GbE CX4 module<br>• 256 MB memory DIMM for FGS<br>• Stacking EEPROM<br>• One 0.5 m CX4 cable<br>• Upgrade installation instructions<br>• Software and documentation CD<br>• Upgrade label | • Electrostatic Discharge (ESD) protection kit<br>• 256 MB memory DIMM for FGS<br>• Stacking EEPROM<br>• One 0.5 m CX4 cable<br>• Upgrade installation instructions<br>• Software and documentation CD<br>• Upgrade label |

## Upgrading hardware

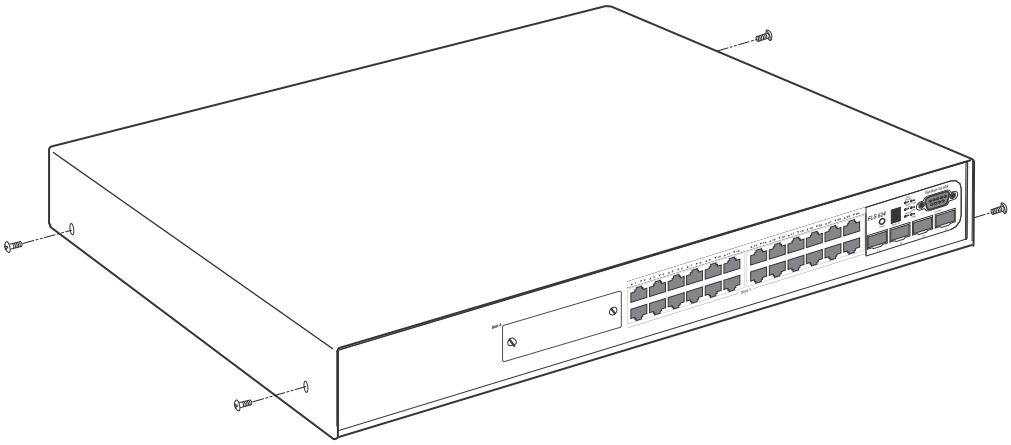
You need a Phillips screwdriver and an ESD wrist strap to perform this procedure. You also need a static-free work area.

Follow the steps below to perform an upgrade.

| | |
|---|---|
| **DANGER** | Disconnect the power cable from all power sources to completely remove power from the device. |
| **GEFAHR** | Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird. |
| **DANGER** | Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif. |
| **PELIGRO** | Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente. |

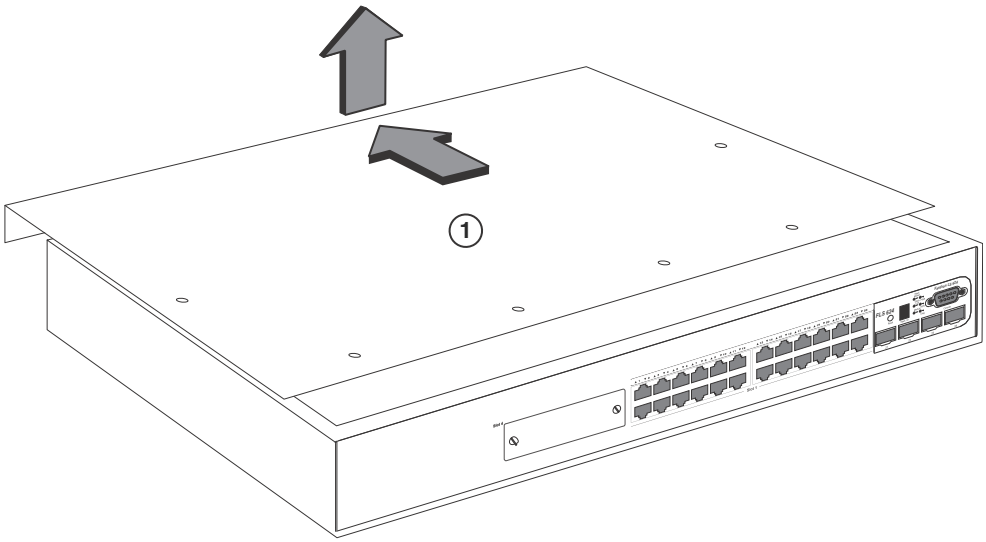
1. Remove any power cables from the device.
2. If the device is mounted in an equipment rack, remove it from the rack and place the device in a static-free work area.
3. Put on the supplied ESD wrist strap and attach the clip end to a metal surface (such as an equipment rack) to act as ground.
4. Disassemble the device as follows (see Figure 26 on page 30):
   - Use a Phillips screwdriver to remove the two screws in the bottom corners of each side. If rack mounting ears are installed, remove the four screws that hold each ear to the device.
   - Turn the device so that the front (where the port connectors are) is facing you.
   - Slide the cover backwards to free the lip edge of the cover from the front plate. Make sure the cover is completely free of the front panel.

**FIGURE 26 Removing cover screws on FLS devices.**



5. Remove the cover by sliding slightly to the rear of the device and then lifting the cover off as shown in Figure 27.

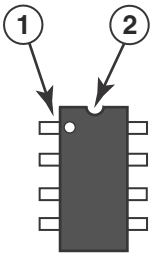
**FIGURE 27 Removing the cover from FLS devices.**



6. Remove the EEPROM from the package and align the lead pins over the EEPROM socket (socket U12 for FLS624 devices, socket U2 for FLS648 devices). Refer to Figure 29 on page 32 for the EEPROM socket and Memory DIMM locations on FLS devices.

   The semicircular indentation on the EEPROM is located on the same end as pin 1.

**FIGURE 28 Pin 1 on EEPROM**




1 Pin 1 2 Semicircular indentation

7. Align the semicircular indentation on the EEPROM with the semicircular cut-out on the EEPROM socket and gently push the EEPROM into the socket.

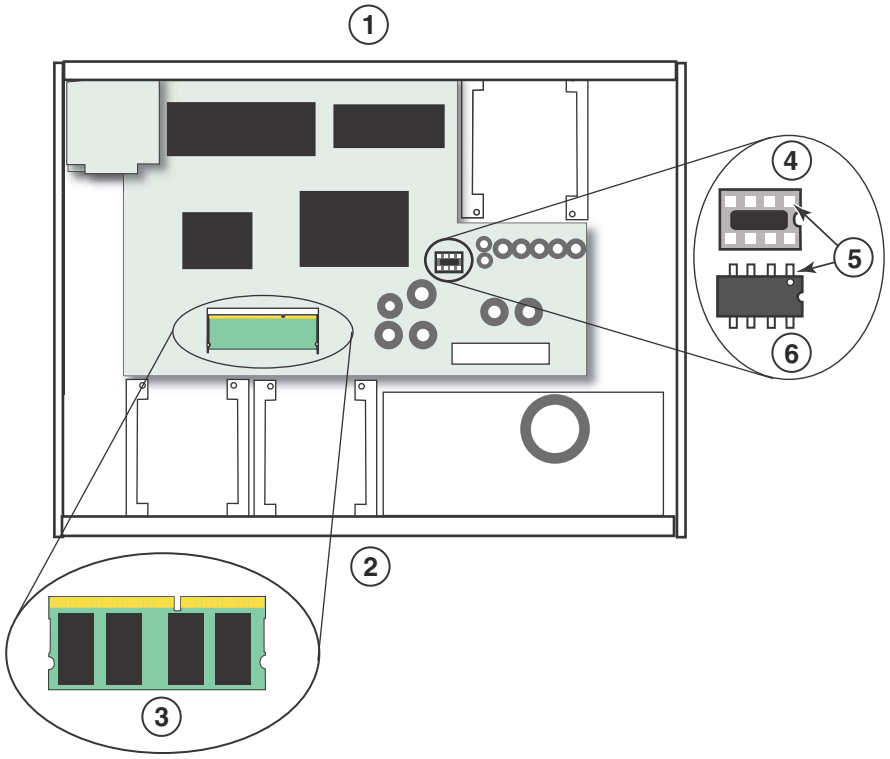
**CAUTION**

**Make sure you insert the EEPROM so that lead pin 1 goes into the correct hole as shown in the appropriate illustrations. If you accidentally insert the EEPROM backwards, the device will not work and may be damaged when you apply power.**

**CAUTION**

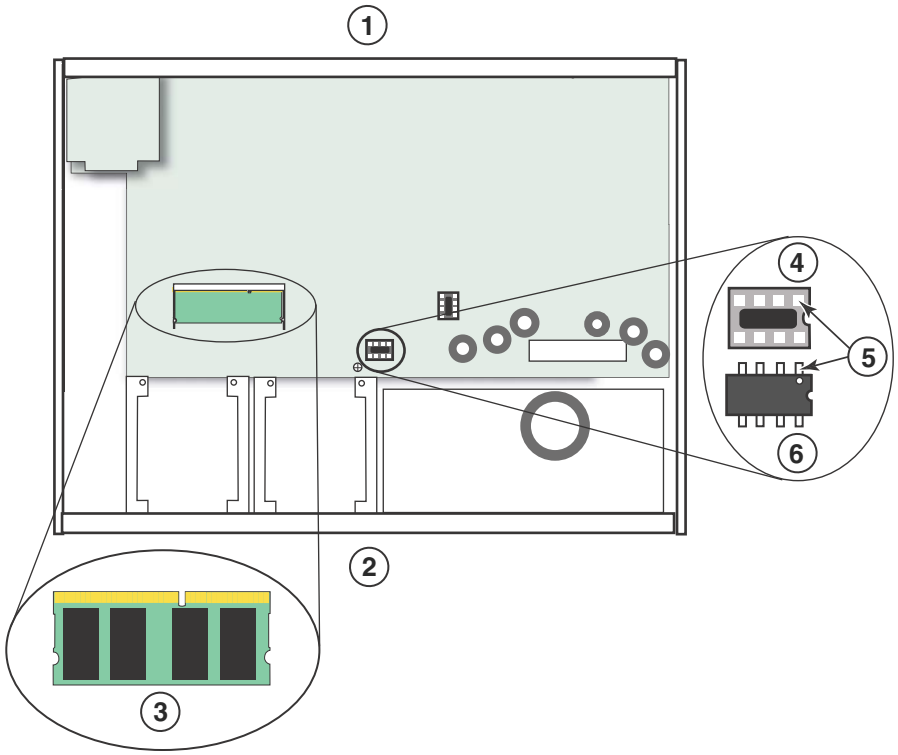
**Do not push too hard. If the EEPROM does not readily go into the socket, stop pushing and verify that the lead pins are straightened and properly aligned over the holes. Straighten any crooked pins, then try again.**

**FIGURE 29 EEPROM socket U12 and memory DIMM location on FLS 624 devices**




| | | | |
|---|---|---|---|
| 1 | FLS624 Front Panel | 2 | FLS Rear Panel |
| 3 | Memory DIMM | 4 | Socket U12 |
| 5 | Pin 1 | 6 | EEPROM |

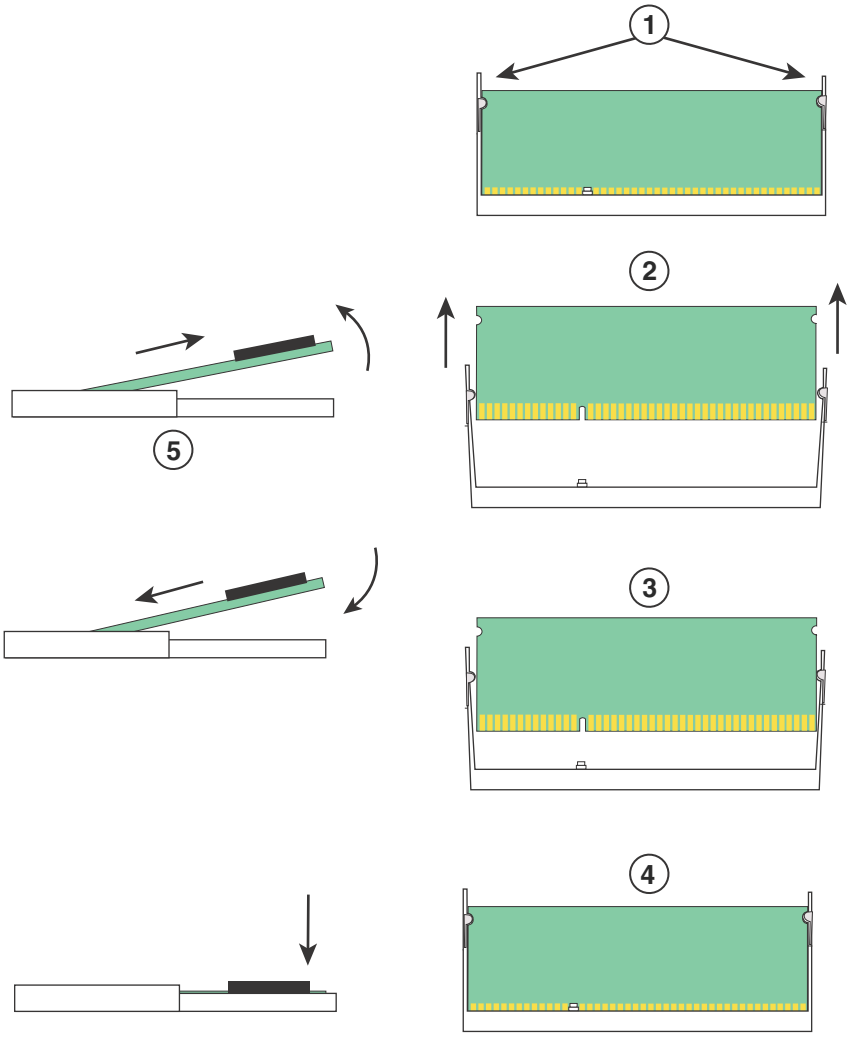
**FIGURE 30 EEPROM socket U2 and memory DIMM locations on FLS 648 devices**




| | | | |
|---|---|---|---|
| 1 | FLS648 Front Panel | 2 | FLS Rear Panel |
| 3 | Memory DIMM | 4 | Socket U2 |
| 5 | Pin 1 | 6 | EEPROM |

8. To replace the memory DIMM, see Figure 31 on page 34. Open the DIMM holder by pushing the tabs apart. Lift the old DIMM up and pull it out of the holder.
9. Slide the new DIMM into the holder at an angle (see Figure 31) and push the connector end into the holder until it snaps into place.
10. Push straight down on the DIMM to lock it into place in the holder.

**FIGURE 31 Replacing the memory DIMM**




11. Install the CX4 module in the slot in the rear panel, if necessary.
12. Replace the cover as follows:
    - Hold the cover on each side at the center and align the front of the cover with the end of the serial interface on the front panel, so that the cover extends slightly past the front panel of the device.
    - Slide the cover backwards until it is fully flush with the top of the device and slides into place.
    - Re-insert the cover screws.
13. If applicable, re-attach the rack mounting ears.
14. Reinstall the device in its equipment rack, if applicable.
15. Re-insert any power cables to power on the device.

Your memory and stacking EEPROM upgrade is now complete. Refer to the *FastIron Configuration Guide* for information about how to operate your device in an IronStack.

# Upgrading software

After you install your EEPROM and memory upgrade components, you will need to upgrade your software. Refer to the software upgrade procedures in the release notes.

Chapter

# Connecting Network Devices and Checking Connectivity 4

## Assigning permanent passwords

DANGER

*The procedures in this manual are for qualified service personnel.*

Table 12 lists the tasks you must perform to connect your Brocade device, and shows you where to get troubleshooting information for any problems you may encounter.

**TABLE 12** Network connectivity tasks

| Step | Task | Page |
|---|---|---|
| 1 | Assigning Permanent Passwords | page 40 |
| 2 | Configuring IP Addresses | page 39 |
| 3 | Connect your device to another networking device. | page 40 |
| 4 | Troubleshoot any problems that can arise. | page 46 |

By default, the CLI is not protected by passwords. To secure CLI access, Brocade strongly recommends assigning passwords. Refer to the *FastIron Configuration Guide*.

**NOTE**
You cannot assign a password using the Web Management Interface. You can assign passwords using IronView if an enable password for a Super User has been configured on the device.

The CLI contains the following access levels:

- **User EXEC** – The level you enter when you first start a CLI session. At this level, you can view some system information but you cannot configure system or port parameters.
- **Privileged EXEC** – This level is also called the Enable level and can be secured by a password. You can perform tasks such as manage files on the flash module, save the system configuration to flash, and clear caches at this level.
- **CONFIG** – The configuration level. This level lets you configure the system IP address and configure switching and routing features. To access the CONFIG mode, you must already be logged into the Privileged level of the EXEC mode.

You can set the following levels of Enable passwords:

- **Super User** – Allows complete read-and-write access to the system. This is generally for system administrators and is the only password level that allows you to configure passwords.

  **NOTE**
  You must set a super user password before you can set other types of passwords.

- **Port Configuration** – Allows read-and-write access for specific ports but not for global (system-wide) parameters.
- **Read Only** – Allows access to the Privileged EXEC mode and CONFIG mode but only with read access.

Follow the steps below to set passwords:

1. At the opening CLI prompt, enter the following command to change to the Privileged level of the EXEC mode:

```
FLS648 Switch> enable
```

2. Access the CONFIG level of the CLI by entering the following command:

```
FLS648 Switch# configure terminal
FLS648 Switch(config)#
```

3. Enter the following command to set the super-user password:

```
FLS648 Switch(config)# enable super-user-password <text>
```

**NOTE**
You must set the super-user password before you can set other types of passwords.

4. Enter the following commands to set the port configuration and read-only passwords:

```
FLS648 Switch(config)# enable port-config-password <text>
FLS648 Switch(config)# enable read-only-password <text>
```

**NOTE**
If you forget your super-user password, see "Recovering from a lost password" on page 38.

**Syntax: enable super-user-password** | **read-only-password** | **port-config-password** <text>

Passwords can be up to 32 characters long.

## Recovering from a lost password

By default, the CLI does not require passwords. However, if someone has configured a password for the device but the password has been lost, you can regain super-user access to the device using the following procedure.

**NOTE**
Recovery from a lost password requires direct access to the serial port and a system reset.

Follow the steps below to recover from a lost password.

1. Start a CLI session over the serial interface to the Brocade device.
2. Reboot the device.
3. While the system is booting, before the initial system prompt appears, enter **b** to enter the boot monitor mode.
4. Enter **no password** at the prompt. (You cannot abbreviate this command.)
5. Enter **boot system flash primary** at the prompt. This command causes the device to bypass the system password check.

After the console prompt reappears, assign a new password.

# Configuring IP addresses

You must configure at least one IP address using the serial connection to the CLI before you can manage the system using the other management interfaces.

For devices in an IronStack, you will need to configure a common IP address for the entire stack. For information about how to do this, see the *FastIron Configuration Guide*.

Brocade devices support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

Follow the steps below:

- To enter a classical network mask, enter the mask in IP address format. For example, enter "209.157.22.99 255.255.255.0" for an IP address with a Class-C subnet mask.
- To enter a prefix number for a network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter "209.157.22.99/24" for an IP address that has a network mask with 24 significant ("mask") bits.

By default, the CLI displays network masks in classical IP address format (example: 255.255.255.0). You can change the display to the prefix format. See the *FastIron Configuration Guide.*

## Devices running layer 2 software

Follow the steps below to configure an IP address on a device running Layer 2 software.

1. At the opening CLI prompt, enter **enable.**

   ```
   FLS648 Switch> enable
   ```

2. Enter the following command at the Privileged EXEC level prompt (for example, FLS648 Switch#), then press **Enter**. This command erases the factory test configuration if it is still present:

   ```
   FLS648 Switch# erase startup-config
   ```

**CAUTION**

**Use the erase startup-config command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file.**

3. Access the configuration level of the CLI by entering the following command:

   ```
   FLS648 Switch# configure terminal          Privileged EXEC Level
   FLS648 Switch(config)#                    Global config Level
   ```

4. Configure the IP address and mask for the device.

   ```
   FLS648 Switch(config)# ip address 192.22.3.44 255.255.255.0
   ```

5. Set a default gateway address for the device.

   ```
   FLS648 Switch(config)# ip default-gateway 192.22.3.1
   ```

**NOTE**
You do not need to assign a default gateway address for single subnet networks.

**Syntax:** **enable** [<*password*>]

**Syntax:** **configure terminal**

**Syntax:** [**no**] **ip address** <*ip-addr*> <*ip-mask*>

or

**Syntax:** [**no**] **ip address** <*ip-addr*>/<*mask-bits*>

**Syntax:** **ip default-gateway** <*ip-addr*>

## Devices running base layer 3 software

You can configure an IP address on the following types of Base Layer 3 device interfaces:

- Ethernet port
- Virtual routing interface (also called a Virtual Ethernet or “VE”)
- Loopback interface

By default, you can configure up to 24 IP addresses on each interface. On Base Layer 3 devicees, you can increase this amount to up to 64 IP subnet addresses per port by increasing the size of the subnet-per-interface table.

**NOTE**
Once you configure a virtual routing interface on a VLAN, you cannot configure Base Layer 3 interface parameters on individual ports in the VLAN. Instead, you must configure the parameters on the virtual routing interface itself.

Brocade devices support both classical IP network masks (Class A, B, and C subnet masks, and so on) and Classless Interdomain Routing (CIDR) network prefix masks.

Follow the steps below:

- To enter a classical network mask, enter the mask in IP address format. For example, enter “209.157.22.99 255.255.255.0” for an IP address with a Class-C subnet mask.
- To enter a prefix network mask, enter a forward slash (/) and the number of bits in the mask immediately after the IP address. For example, enter “209.157.22.99/24” for an IP address that has a network mask with 24 significant bits (ones).

By default, the CLI displays network masks in classical IP address format (example: 255.255.255.0). You can change the display to prefix format.

## Assigning an IP address to an Ethernet port

To assign an IP address to port 0/1/1, enter the following commands:

```
FastIron(config)# interface ethernet 0/1/1
FastIron(config-if-0/1/1)# ip address 192.45.6.1 255.255.255.0
```

**NOTE**
You also can enter the IP address and mask in CIDR format, as follows:
FastIron`(config-if-0/1/1)# ip address 192.45.6.1/24`

**Syntax:** [**no**] **ip address** <*ip-addr*> <*ip-mask*>

or

**Syntax:** [**no**] **ip address** <*ip-addr*>/<*mask-bits*>

### *Assigning an IP address to a loopback interface*

Loopback interfaces are always up, regardless of the states of physical interfaces. They can add stability to the network because they are not subject to port flap problems that can occur due to unstable links between a Layer 3 Switch and other devices. You can configure up to four loopback interfaces on each device, and you can add up to 24 IP addresses to each loopback interface.

**NOTE**
If you configure the device to use a loopback interface to communicate with a BGP4 neighbor, you must also configure a loopback interface on the neighbor and configure the neighbor to use that loopback interface to communicate with the device.

To add a loopback interface, enter commands such as those shown in the following example:

```
FastIron(config-bgp-router)# exit
FastIron(config)# interface loopback 1
FastIron(config-lbif-1)# ip address 10.0.0.1/24
```

**Syntax: interface loopback** <*num*>

The <*num*> parameter specifies the virtual interface number. You can specify from 1 to the maximum number of virtual interfaces supported on the device. To display the maximum number of virtual interfaces supported on the device, enter the **show default values** command. The maximum is listed in the System Parameters section, in the Current column of the virtual-interface row.

### *Assigning an IP address to a virtual interface*

This section describes how to configure an IP address on a virtual interface.

A virtual interface is a logical port associated with a Layer 3 Virtual LAN (VLAN) configured on a Base Layer 3 device. You can configure routing parameters on the virtual interface to enable the Layer 3 device to route protocol traffic from one Layer 3 VLAN to the other, without using an external router.

**NOTE**
The device uses the lowest MAC address on the device (the MAC address of port 0/1/1) as the MAC address for all ports within all virtual interfaces you configure on the device.

To add a virtual interface to a VLAN and configure an IP address on the interface, enter commands such as the following:

```
FastIron(config)# vlan 2 name IP-Subnet_1.1.2.0/24
FastIron(config-vlan-2)# untag e0/1/1 to 0/1/4
FastIron(config-vlan-2)# router-interface ve1
FastIron(config-vlan-2)# interface ve0/1/1
FastIron(config-vif-1)# ip address 1.1.2.1/24
```

The first two commands in this example create a Layer 3 protocol-based VLAN name "IP-Subnet_1.1.2.0/24" and add a range of untagged ports to the VLAN. The **router-interface** command creates virtual interface 1 as the routing interface for the VLAN. The last two commands change to the interface configuration level for the virtual interface and assign an IP address to the interface.

**Syntax: router-interface ve** <*num*>

**Syntax: interface ve** <*num*>

### *Deleting an IP address*

To delete an IP address, enter a command similar to the following:

```
FastIron(config-if-e1000-1)# no ip address 1.1.2.1
```

This command deletes IP address 1.1.2.1. You do not need to enter the subnet mask.

To delete all IP addresses from an interface, enter the following command:

```
FastIron(config-if-e1000-1)# no ip address *
```

**Syntax: no ip address** <*ip-addr*> | *

## Connecting network devices

Brocade devices support connections to other vendors' routers, devicees, and hubs, as well other Brocade devices.

## Connectors

For port pinouts, see the section "Pinouts and signaling" on page 63.

## Cable specifications

Refer to "Cable specifications" on page 64 for cable lengths and types.

## Connecting to Ethernet or fast Ethernet hubs

For copper connections to Ethernet hubs, a 10/100BaseTX or 1000BaseT device, or another Brocade device, a crossover cable is required (Figure 32 and Figure 33). If the hub is equipped with an uplink port, it will require a straight-through cable instead of a crossover cable.

**NOTE**
The 802.3ab standard (automatic MDI or MDIX detection) calls for automatic negotiation of the connection between two 1000Base-T ports. Therefore, a crossover cable may not be required; a straight-through cable may work as well. For more information about this feature, see the *FastIron Configuration Guide*.

**FIGURE 32 UTP crossover cable**

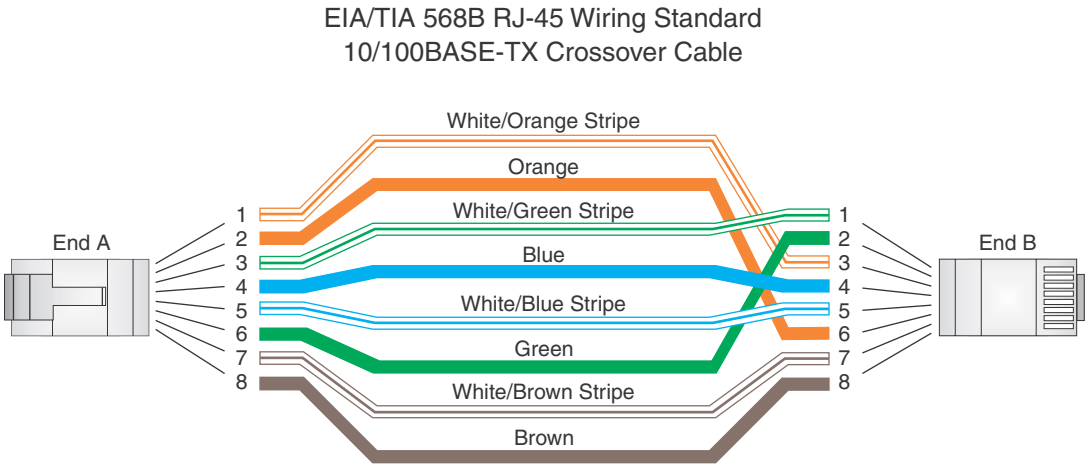
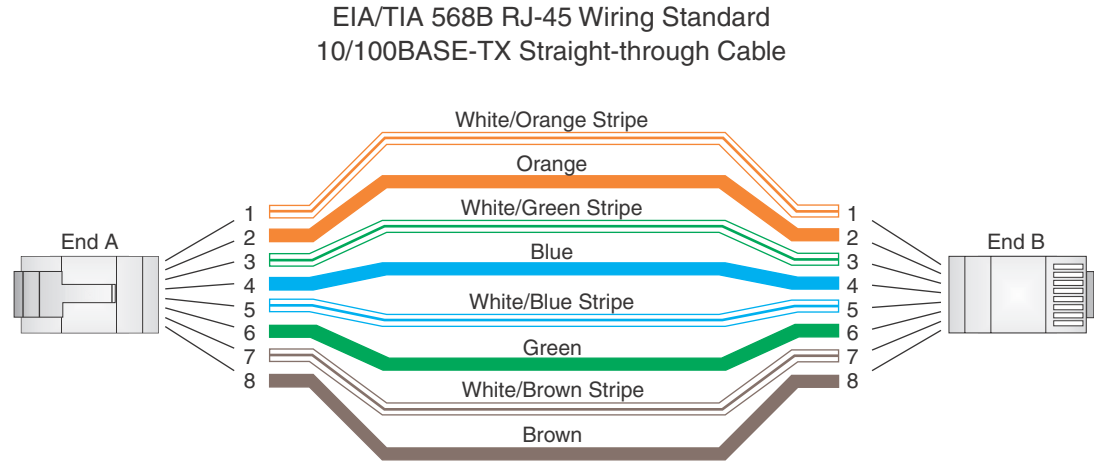



**FIGURE 33 Straight-through cable**




## Connecting to workstations, servers, or routers

Straight-through UTP cabling is required for direct UTP attachment to workstations, servers, or routers using network interface cards (NICs).

Fiber cabling is required for direct attachment to Gbps NICs or devicees and routers through fiber ports. See "Connecting a network device to a fiber port" on page 44.

### *Automatic MDI or MDIX detection*

All 10/100 and Gbps Ethernet copper ports on the Brocade FastIron devices support automatic Media Dependent Interface (MDI) and Media Dependent Interface Crossover (MDIX) detection. This feature is enabled on all 10/100 and Gbps copper ports by default. For each port, you can disable auto MDI or MDIX, designate the port as an MDI port, or designate the port as an MDIX port.

For more information about this feature and how configure it, see the *FastIron Configuration Guide*.

## Connecting a network device to a fiber port

For direct attachment from the Brocade device to a Gbps NIC, device, or router, fiber cabling with an LC connector is required.

To connect the Brocade device to another network device using a fiber port, you must do the following:

- Install a fiber optic module (SFP transceiver or mini-GBIC for Gbps Ethernet ports, or XFP-MSA transceiver for 10 Gbps Ethernet ports)
- Cable the fiber optic module

The following sections provide information about performing these tasks.

### *Installing a fiber optic module*

You must install a fiber optic module (SFP or XFP transceiver) in each Gbps Ethernet and 10 Gbps Ethernet fiber port you want to use.

You can install a new fiber optic module in a port while the FastIron LS is powered on and running.

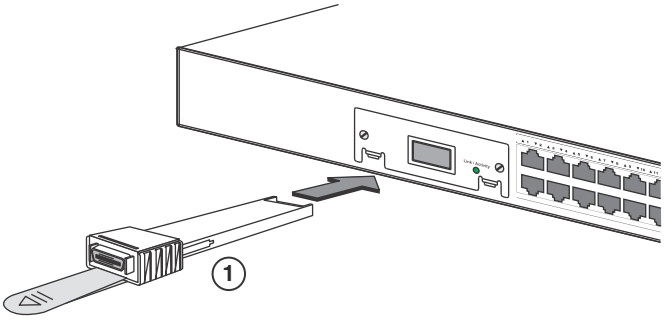
Before installing a module into the port, have an ESD wrist strap with a plug for connection to a metal surface available.

**NOTE**
For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.

Follow the steps below to Install a fiber optic module.

1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack) to act as ground.
2. Remove the new module from the protective packaging.
3. Gently insert the fiber optic module into the port until the module clicks into place. The module is keyed to prevent incorrect insertion.

**FIGURE 34 Installing a fiber optic module**




1 CX4 fiber optic module

### *Cabling a fiber optic module*

1. Remove the protective covering from the fiber optic port connectors and store it for future use.
2. Before cabling a fiber optic module, Brocade strongly recommends cleaning the cable connectors and the port connectors. For more information, see "Cleaning the fiber-optic connectors" on page 45.
3. Gently insert the cable connectors (a tab on each connector should face upward) into the port connectors until the tabs lock into place.
4. Observe the link and active LEDs to determine if the network connections are functioning properly. For more information about the LED indicators, see Table 13 on page 46.

### *Cleaning the fiber-optic connectors*

To avoid problems with the connection between the fiber optic module (SFP (mini-GBIC) or XFP) and the fiber cable connectors, Brocade strongly recommends cleaning both connectors each time you disconnect and reconnect them. In particular, dust can accumulate in the connectors and cause problems such as reducing the optic launch power.

To clean the fiber cable connectors, Brocade recommends using the fiber optic reel-type cleaner that shipped with your FastIron LS. You can also purchase this type of cleaner from the following Website:

*http://www.fisfiber.com/Home_Page.asp*

When not using an SFP or XFP connector, make sure to keep the protective covering on.

# Testing connectivity

To test connectivity, observe the LEDs related to network connection.

## Observing LEDs

After you install the network cables, you can observe LEDs to determine if the network connections are functioning properly. Table 13 describes the LEDs related to the network connections, the desired state of each LED, possible abnormal states of each LED, and what to do if an LED indicates an abnormal state.

**TABLE 13** Network connection-related LED states

| LED | Desired state | Meaning | Abnormal state | Meaning or action |
|---|---|---|---|---|
| Link (Lnk) | On (Green) | A link is established with the remote port. | Off | A link is not established with the remote port. You can do the following:<br>• Verify that the connection to the other network device has been properly made. Also, make certain that the other network device is powered on and operating correctly.<br>• Verify that the transmit port on the Brocade device is connected to the receive port on the other network device, and that the receive port on the Brocade device is connected to the transmit port on the other network device. If you are not certain, remove the two cable connectors from the port connector and reinsert them in the port connector, reversing their order.<br>• Dust may have accumulated in the cable connector or port connector. For information about cleaning the connectors, see "Cleaning the fiber-optic connectors" on page 45.<br>• If the other actions do not resolve the problem, try using a different port or a different cable. |
| Active (Act) | On or blinking (Yellow) | The port is transmitting and receiving user packets. | Off for an extended period. | The port is not transmitting or receiving user packets. You can do the following:<br>• Check the Link LED to make sure the link is still established with the remote port. If not, take the actions described in the Meaning or Action column for the Link LED.<br>• Verify that the port has not been disabled through a configuration change. You can use the CLI. If you have configured an IP address on the device, you also can use the Web management interface or IronView. |

If a problem persists after taking these actions, contact Brocade Technical Support.

# Troubleshooting network connections

To troubleshoot network connections, follow the steps given below:

- For the indicated port, verify that both ends of the cabling (at the Brocade device and the connected device) are snug.

- Verify that the Brocade device and the connected device are both powered on and operating correctly.
- Verify that you have used the correct cable type for the connection:
  - For twisted-pair connections to an end node, use straight-through cabling.
  - For fiber optic connections, verify that the transmit port on the device is connected to the receive port on the connected device, and that the receive port on the device is connected to the transmit port on the connected device.
- You can use the CLI to verify that the port has not been disabled through a configuration change. If you have configured an IP address on the device, you also can use the Web Management Interface or IronView.
- If the other procedures do not resolve the problem, try using a different port or a different cable.

Chapter

# Maintaining the FLS and FLS-STK Hardware 5

## Managing FastIron LS temperature settings

DANGER

*The procedures in this manual are for qualified service personnel.*

This section describes how to display temperature settings on FastIron LS devices, and how to change the temperature warning and shutdown levels.

**NOTE**
Maintenance functions for FLS-STK devices that are part of an IronStack are done through the console connection on the Active Controller for the stack. You can display information about individual stack units, or for the entire stack.

### Using the temperature sensor

FastIron LS and LS-STK devices have two built-in temperature sensors that measure IC and board temperatures. The temperature sensors cause the device to generate a Syslog message and SNMP trap if the temperature exceeds a specified warning level or shutdown level. If the temperature exceeds the safe threshold (shutdown level), the device will reboot.

The software reads the temperature sensors according to the device poll time, which is 60 seconds by default. If the temperature equals or exceeds the shutdown temperature for five consecutive polls, the software will reboot the device to prevent damage.

You can use the CLI or Web Management Interface to do the following tasks:

- Display the temperature of the device
- Change the warning and shutdown temperature levels
- Change the device poll time

### Displaying the temperature

By default, the software polls the temperature sensor every 60 seconds to get the current temperature. This poll rate is controlled by the device poll time, which also controls how often the software polls other system components.

To display the temperature of a device, enter the **show chassis** command at any level of the CLI:

```
FLS648 Switch> show chassis
Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present

Fan 1 ok, speed (auto): [[1]]<->2<->3
Fan 2 ok, speed (auto): [[1]]<->2<->3
Fan 3 ok, speed (auto): [[1]]<->2<->3

Fan controlled temperature: 37.0 deg-C

Fan speed deviceing temperature thresholds:
               Speed 1: NM<----->50  deg-C
               Speed 2:       40<----->55  deg-C
               Speed 3:              50<-----> 90 deg-C (shutdown)

Sensor B Temperature Readings:
        Current temperature : 37.0 deg-C
        Warning level.......: 55.0 deg-C
        Shutdown level......: 90.0 deg-C
Sensor A Temperature Readings:
        Current temperature : 33.5 deg-C
Boot Prom MAC: 001b.ed5d.9f00
Management MAC: 001b.ed5d.9f00
```

The following output is from the **show chassis** command on an IronStack Active Controller. Temperature settings for an IronStack are displayed globally.

```
FLS648P device# show chassis
The stack unit 1 chassis info:

Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present

Fan 1 ok
Fan 2 ok
Exhaust Side Temperature Readings:
        Current temperature : 35.5 deg-C
        Warning level.......: 80.0 deg-C
        Shutdown level......: 90.0 deg-C
Intake Side Temperature Readings:
        Current temperature : 33.5 deg-C
Boot Prom MAC: 0012.f2de.9440
Management MAC: 0000.0000.0011

The stack unit 2 chassis info:

Power supply 1 (NA - AC - Regular) present, status ok
Power supply 2 not present

Fan 1 ok
Fan 2 ok
--More--, next page: Space, next line: Return key, quit: Control-c
```

**NOTE**
This information reflects IC and board temperatures. It does not reflect ambient temperature.

Syntax: show chassis

### *Displaying Syslog messages for temperature*

The software sends a Syslog message and an SNMP trap if the temperature crosses the warning or shutdown thresholds. The following methods describe how to view the system log on the device. If you have configured the device to use a Syslog server or SNMP trap receiver, see the documentation for the server or receiver.

To display the system log, enter the **show log** command at any CLI level:

```
FLS648 Switch# show log
Syslog logging: enabled (0 messages dropped, 0 flushes, 0 overruns)
Buffer logging: level ACDMEINW, 8 messages logged
level code: A=alert C=critical D=debugging M=emergency E=error
I=informational N=notification W=warning

Static Log Buffer:

Dynamic Log Buffer (50 entries):

at 0 days 0 hours 2 minutes 0 seconds, level alert
Temperature 48.0 C degrees, warning level 45.0 C degrees, shutdown level 55.0 C
degrees

at 0 days 0 hours 1 minutes 0 seconds, level alert
Temperature 50.0 C degrees, warning level 45.0 C degrees, shutdown level 55.0 C
degrees
```

Logs for devices in and IronStack are displayed globally for the entire stack.

Syntax: show log

## Changing the temperature warning and shutdown levels

The default warning temperatures and the default shutdown temperatures for FLS devices are:

For the FLS624 and FLS624-STK:

- Warning temperature is 85 degrees C (exhaust side)
- Shutdown temperature is 90 degrees C (exhaust side)

For the FLS648 and FLS648-STK:

- Warning temperature is 85 degrees C (exhaust side)
- Shutdown temperature is 90 degrees C (exhaust side)

**NOTE**
These temperatures reflect the temperature of the board inside the device.

To change the temperature at which the device sends a warning, enter a command similar to the following at the Privileged EXEC level of the CLI:

```
FastIron# temperature warning 47
```

**Syntax: temperature warning** <*value*>

The <*value*> can be 0 – 125.

#### For devices in an IronStack

To change the temperature warning level for a device in an IronStack, enter a command similar to the following:

```
FLS624 device# temperature warning 2 82
```

**Syntax: temperature warning** <*unit-id*> <*value*>

### *Changing the temperature shutdown level*

To change the temperature at which the device sends a warning, enter a command similar to the following:

```
FastIron# temperature shutdown 47
```

**Syntax: temperature shutdown** <*value*>

The <*value*> can be 0 – 125.

#### For devices in an IronStack

To change the temperature shutdown level for a device in an IronStack, enter a command similar to the following:

```
FLS624 device# temperature shutdown 2 90
```

**Syntax: temperature shutdown** <*unit-id*> <*value*>

## Changing the device temperature polling interval

The software reads the temperature sensor and polls other hardware sensors according to the value set for the device poll time, which is 60 seconds by default. You can change the device poll time using the CLI.

To change the device poll time for standalone devices or for devices in an IronStack, enter a command similar to the following at the global CONFIG level:

```
FastIron(config)# chassis poll-time 200
```

**Syntax: chassis poll-time** <*seconds*>

# Displaying FastIron LS CPU usage

You can display the amount of CPU use by entering the **show cpu** command at any level of the CLI:

```
FLS648 Switch# show cpu
31 percent busy, from 3248 sec ago
1   sec avg:  31 percent busy
5   sec avg:  31 percent busy
60  sec avg:  31 percent busy
300 sec avg:  31 percent busy
```

Syntax: show cpu

# Hardware maintenance schedule

FLS devices require minimal maintenance for the hardware components. Brocade recommends cleaning the fiber-optic connectors on a fiber-optic port and the connected fiber cable each time you disconnect the cable.

In addition, you can replace the following hardware components as needed:

- Copper and fiber optic modules (SFPs (mini-GBICs) and XFP transceivers)
- 10 Gbps Ethernet module

# Installing or replacing a 10 Gbps Ethernet module

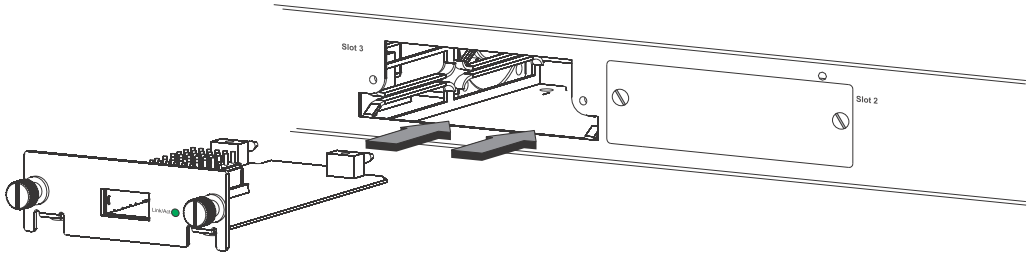
The 1-port and 10 Gbps Ethernet modules are optional. FLS-STK models come with modules installed, but you can remove or replace them if necessary. You can order the FLS with a 10 Gbps module installed at the factory, or you can upgrade your device later.

This section provides the steps for installing, removing, and replacing the 10 Gbps Ethernet module. You will need the following tools to perform these procedures:

- #2 Phillips screwdriver
- Electrostatic Discharge (ESD) kit.

## Installing an optional module in the device

**FIGURE 35 Installing an optional module**




**NOTE**
Slide-in modules are **not** hot-swappable. You must power down the device before installing or removing a module.

Follow the steps below to install an optional module.

1. Power down the device.
2. Remove the blank metal plate (or a previously installed module) from the appropriate slot by removing the two screws with a flat-head screwdriver.

3. Before opening the package that contains the new module, touch the bag to the device casing to discharge any potential static electricity. Also, Brocade recommends using an ESD wrist strap during installation.
4. Remove the module from the anti-static shielded bag.
5. Holding the module level, guide it into the carrier rails on each side and push it all the way into the slot until it firmly engages with the connector.
6. When the module is engaged, tighten the retainer screws to secure the module in the slot.
7. When the device is powered on, the Module LED on the device front panel should turn green to confirm that the module is correctly installed and ready to use.

### Removing a 10 Gbps Ethernet module

1. Remove the 10 Gbps module:
   - Use a #2 Phillips screwdriver to loosen and remove the two screws on the 10 Gbps module.
   - Gently lift the module up and out of the device.
2. Place the 10 Gbps module in an anti-static bag for storage.
3. Do one of the following:
   - Insert the new 10 Gbps module as instructed in the section "Installing an optional module in the device" on page 53.
   - If you are removing the module without replacing it, install the blank face plate over the empty slot.

## Replacing a fiber optic module

You can remove an SFP or XFP module from a port and replace it with a new one while the FastIron LS device is powered on and running.

Before removing a fiber optic module, have the following on hand:

- An ESD wrist strap with a plug for connection to the ESD connector on the FastIron LS.
- The protective covering that you removed from the fiber optic module when you initially installed the module.

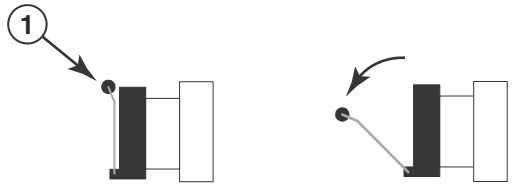
DANGER

***For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.***

Follow the steps below to remove a fiber optic module from a 1 Gbps Ethernet or 10 Gbps Ethernet port.

1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack).
2. Disconnect the fiber cable connector from the port connector.
3. Insert the protective covering into the port connectors.

4. Pull the bail latch on the module forward and away from the module. This unlocks the module from the front panel.




1 Bail latch

**NOTE**
The bail latch may be attached to either the top or the bottom of the mini-GBIC.

5. Grasping the bail latch, pull the fiber optic module out of the port.
6. Store the fiber optic module in a safe, static-free place or in an anti-static bag.
7. Install a new fiber optic module in the port. For information about performing this task, see "Installing a new fiber optic module".

## Installing a new fiber optic module

You must install a fiber optic module (SFP or XFP transceiver) in each Gbps Ethernet and 10 Gbps Ethernet fiber port you want to use.

You can install a new fiber optic module in a port while the FastIron LS is powered on and running.

Before installing a module, have a ESD wrist strap with a plug for connection to a metal surface.

**NOTE**
For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor.

Follow the steps below to install a fiber optic module.

1. Put on the ESD wrist strap and ground yourself by attaching the clip end to a metal surface (such as an equipment rack) to act as ground.
2. Remove the new module from the protective packaging.
3. Gently insert the fiber optic module into the port until the module clicks into place. The module is keyed to prevent incorrect insertion.

# Cabling a fiber optic module

Follow the steps below to cable a fiber optic module.

1. Remove the protective covering from the fiber optic port connectors and store the covering for future use.
2. Before cabling a fiber optic module, Brocade strongly recommends cleaning the cable connectors and the port connectors. Refer to "Cleaning the fiber optic connectors" on page 56.

3. Gently insert the cable connector (a tab on each connector should face upward) into the port connector until the tabs lock into place.
4. Observe the link and active LEDs to see if the network connections are functioning properly. For more information about the LED indicators, see Table 13 on page 46.

# Cleaning the fiber optic connectors

To avoid problems with the connection between the fiber optic module and the fiber cable connectors, Brocade strongly recommends cleaning both connectors each time you disconnect and reconnect them. Dust can accumulate in the connectors and cause problems such as reducing the optic launch power.

To clean the fiber cable connectors, Brocade recommends using the fiber-optic reel-type cleaner that shipped with your FastIron LS device. You can also purchase this type of cleaner from the following Website:

*http://www.fisfiber.com/Home_Page.asp*

When not using a fiber optic connector, make sure to keep the protective covering on.

# Digital optical monitoring

You can configure your Brocade device to monitor optical transceivers in the system, either globally or by specified port. When this feature is enabled, the system monitors the temperature and signal power levels for the optical transceivers in the specified ports. Console messages and syslog messages are sent when optical operating conditions fall below or rise above the XFP or SFP manufacturer recommended thresholds. For more information about digital optical monitoring, see the *FastIron Configuration Guide*.

Chapter

# 6

# Troubleshooting

## Diagnosing device indicators

This chapter describes LED indicators and the steps required to troubleshoot problems.

**TABLE 14** Troubleshooting chart

| Symptom | Action |
|---|---|
| Power LED is Off | • Internal power supply is disconnected.<br>• Check connections between the device, the power cable, and the wall outlet.<br>• Contact Technical Support. |
| Power LED is Amber | • Internal power supply has failed. Contact Technical Support. |
| Diag LED is Amber | • The device self test has detected a fault.<br>• Power cycle the device to try and clear the condition. If the condition persists, contact Technical Support. |
| Link LED is Off | • Verify that the device and attached device are powered on.<br>• Be sure the cable is plugged into both the device and corresponding device.<br>• Verify that the proper cable type is used and the length does not exceed specified limits.<br>• Check the adapter on the attached device and cable connections for possible defects. Replace the defective adapter or cable if necessary. |
| (RPS2-EIF) Link LED is Off | • The port does not have a valid connection to the device.<br>• Check connections between the device, the power cable, and the wall outlet. |
| (RPS2-EIF) Link LED is Amber | • Primary power supply is active. RPS unit is on standby. |
| (RPS2-EIF) Activity LED is Green | • Primary power supply is off. RPS unit is now active |

### Power and cooling problems

If the power indicator does not turn on when the power cable is plugged in, you may have a problem with the power outlet, power cable, or internal power supply. However, if the unit powers off after running for a while, check for loose power connections, power losses or surges at the power outlet, and verify that the fans on the unit are unobstructed and running prior to shutdown. If you still cannot isolate the problem, the internal power supply may be defective. In this case, contact Technical Support for assistance.

### Installation

Verify that all system components have been properly installed. If one or more components appear to be malfunctioning (such as the power cable or network cabling), test them in an alternate environment where you are sure that all the other components are functioning properly.

## In-band access

You can access the management agent in the device from anywhere within the attached network using Telnet, a Web browser, or other network management software. However, you must first configure the device with a valid IP address, subnet mask, and default gateway. If you have trouble establishing a link to the management agent, make sure you have a valid network connection. Then verify that you entered the correct IP address. Also, be sure the port through which you are connecting to the device has not been disabled. If it has not been disabled, then check the network cabling that runs between your remote location and the device.

Chapter

# 7

# Hardware Specifications

## FastIron LS and LS-STK specifications

The following sections describe the hardware specifications for the FastIron LS and LS-STK devices.

### Physical dimensions

Table 15 and Table 16 list the dimensions and weight for the FastIron LS and LS-STK devices. Table 17 lists the dimensions and weight of the FLS1XG and FLS-1XGC modules.

**TABLE 15** Physical dimensions and weight of the FLS624 and FLS624-STK devices

| Platform | Height | Width | Depth | Weight |
|---|---|---|---|---|
| FLS624 | 4.34 cm<br>1.7 in | 44 cm<br>17.32 in | 32.84 cm<br>12.93 in | • 4.52 kg (10 lb) |
| FLS624-STK | 4.34 cm<br>1.7 in | 44 cm<br>17.32 in | 32.84 cm<br>12.93 in | • 4.52 kg (10 lb) |

**TABLE 16** Physical dimensions and weight of the FLS648 and FLS648-STK devices

| Platform | Height | Width | Depth | Weight |
|---|---|---|---|---|
| FLS648 | 4.34 cm<br>1.7 in | 44 cm<br>17.32 in | 32.84 cm<br>12.93 in | • 4.94 kg (10.9 lbs) |
| FLS648-STK | 4.34 cm<br>1.7 in | 44 cm<br>17.32 in | 32.84 cm<br>12.93 in | • 4.94 kg (10.9 lbs) |

**TABLE 17** Physical dimensions and weight of the FLS1XG and FLS-1XGC modules

| Platform | Height | Width | Depth | Weight |
|---|---|---|---|---|
| FLS1XG | 2.85 cm<br>1.12 in | 8.2 cm<br>3.23 in | 13.5 cm<br>5.31 in | 86.2 g |
| FLS-1XGC | 2.85 cm<br>1.12 in | 8.2 cm<br>3.23 in | 13.5 cm<br>5.31 in | 108.6 g |

### Environmental considerations

For optimal performance, operate or store your Brocade device in compliance with the following environmental conditions.

### *Operating environment*

Table 18 lists the operating environment specifications for FastIron LS and LS-STK devices.

**TABLE 18** Operating environment

| Operating temperature | Relative humidity | Operating altitude | Maximum BTUs |
|---|---|---|---|
| 0 – 50 Deg. C (32 – 122 Deg. F) | 5 to 95%, @ 50 Deg. C(121.9 Deg. F), non-condensing | 0 – 2000 meters(0 – 6,600 ft) | FLS624 and FLS648: 100 watts (340 BTU/Hr) per power supply |

### *Storage environment*

Table 19 lists the storage environment specifications for FastIron LS and LS-STK devices.

**TABLE 19** Storage environment

| Storage temperature | Storage humidity | Storage altitude |
|---|---|---|
| -40 to 70 Deg. C,-40 to 158 Deg. F | 95% maximum, non-condensing | 3,000 meter(10,000 feet) maximum |

### *Mean Time Before Failure*

Table 20 provides the initial MTBF result for the FastIron LS (including the power supply).

**TABLE 20** Mean Time Before Failure specifications

| | Platform | Temperature | System failure rate |
|---|---|---|---|
| System MTBF | FLS624 | 25 Deg. C (76.9 Deg. F) | 6,154.453471 |
| 162,484 | 50 Deg. C (121.9 Deg. F) | 15,164.358600 | 65,944 |
| FLS648 | 25 Deg. C (76.9 Deg. F) | 6,672.450037 | 149,870 |
| 50 Deg. C (121.9 Deg. F) | 15,531.295633 | 64,386 | |

### *AC power supply compatibility matrix*

Table 21 lists the FastIron Products and AC redundant power supplies, and shows which units are compatible.

**TABLE 21** FastIron AC power supply compatibility matrix

| Device | RPS5 220 watts | RPS8 600 watts | RPS-X424 220 watts | RPS-X424-POE 600 watts | RPS-X448 600 watts | RPS-FGS 600 watts | RPS2-EIF 150 watts |
|---|---|---|---|---|---|---|---|
| FastIron Edge device | Yes | No | Yes | No | No | No | No |
| FastIron Edge device - Power Over Ethernet | No | Yes | No | Yes | Yes | Yes | No |
| FastIron X Series with 24 ports (except FESX424-POE) | Yes | No | Yes | No | No | No | No |
| FESX424-POE | No | Yes | No | Yes | Yes | Yes | No |
| FastIron X Series with 48 ports | No | Yes | No | Yes | Yes | Yes | No |

**TABLE 21** FastIron AC power supply compatibility matrix (Continued)

| Device | RPS5 220 watts | RPS8 600 watts | RPS-X424 220 watts | RPS-X424-POE 600 watts | RPS-X448 600 watts | RPS-FGS 600 watts | RPS2-EIF 150 watts |
|---|---|---|---|---|---|---|---|
| FastIron GS<br>FastIron GS-STK<br>FastIron GS POE<br>FastIron GS-STK POE | No | Yes | No | Yes | Yes | Yes | No |
| FastIron LS<br>FastIron LS-STK | No | No | No | No | No | No | Yes |
| FastIron WS | No | No | No | No | No | No | Yes |

## Cooling

The cooling fans cool the CPU, main memory, and voltage regulators. The fans use either a push or pull configuration to move the air from the left side of the device to the right side of the device.

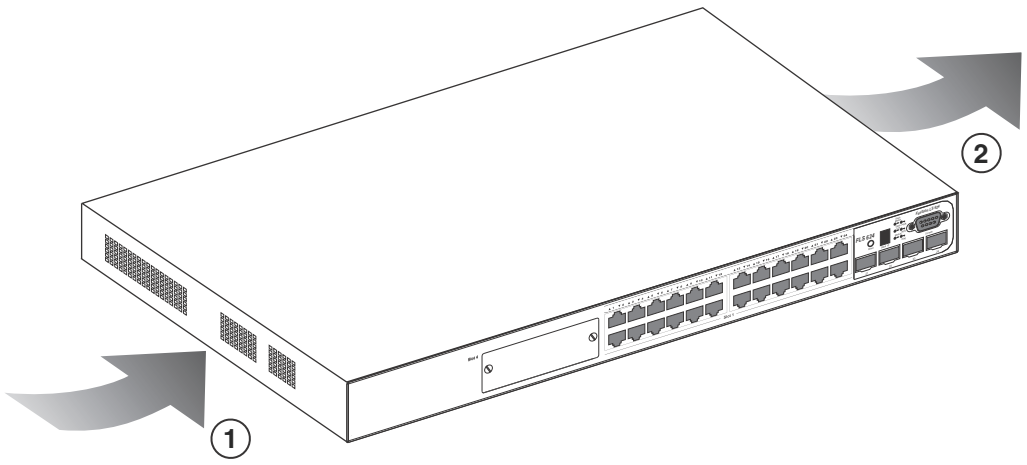
Specifications are given below:

- Total cooling capacity: 80 to 100 watts
- Total air flow: 200 LFM
- Typical operating noise: < 43 dB-A

**NOTE**
Operating noise is based on the ISO 7779 standard.

Figure 36 shows the device airflow direction.

**FIGURE 36** FastIron LS and FastIron LS-STK device airflow




1 Air inlet 2 Air exhaust

## Regulatory compliance

Table 22 lists the Electromagnetic Compatibility (EMC), Immunity standards, and safety agency approvals for all FastIron devices.

**TABLE 22** Regulatory compliance and safety approvals

| Certifications |
|---|
| **Emissions:**<br>• ICES-003, Electromagnetic Emission<br>• FCC Part 15 Class A<br>• EN 55022 or CISPR 22 Class A<br>• VCCI Class A<br>• EN 61000-3-2, Power Line Harmonics<br>• EN 61000-3-3, Voltage Fluctuation & Flicker<br>• EN 61000-6-3, Electromagnetic Compatibility, Generic Standard<br>• AS or NZS CISPR 22, Electromagnetic Compatibility |
| **Immunity:**<br>• EN 61000-6-1, Electromagnetic Compatibility, Generic Standard<br>• EN 55024, Information Technology equipment - Immunity Characteristics |
| **Safety:**<br>• BI-NAT CSA 60950-1-03 or UL 60950-1<br>• EN 60950-1:2001<br>• IEC 60950-1:2001 |

### *FCC CFR 47 part 15 warning*

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

**CAUTION**

**Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

### *CISPR 22 CLASS A warning*

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### *VCCI*

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

## Warranty

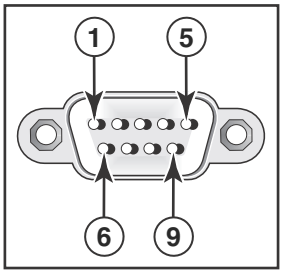
FastIron devices include a 5-year limited lifetime warranty.

## Pinouts and signaling

This section lists the pinouts for the DB-9 connector and RJ-45 port jacks.

### *Serial (console) port pinouts*

The Console port is a standard male DB-9 connector, as shown in the following figure:




| | |
|---|---|
| 1 | Pin 1 |
| 5 | Pin 5 |
| 6 | Pin 6 |
| 9 | Pin 9 |

Most PC serial ports require a cable with a female DB-9 connector. However, terminal connections will vary, requiring a cable with either a DB-9 or DB-25 connector, male or female.

Serial cable options between the FastIron LS device and a PC or terminal are shown in Figure 37.

**NOTE**
As indicated in Figure 37 and Figure 38, some of the wires should not be connected. If you do connect the wires that are labeled “Reserved”, you might get unexpected results with some terminals.

**FIGURE 37** Console port pin assignments showing cable connection options to a terminal or PC

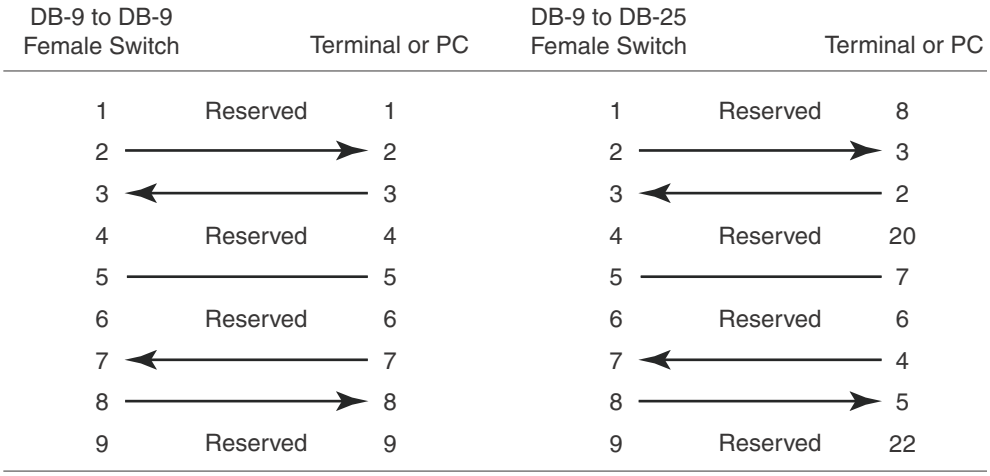
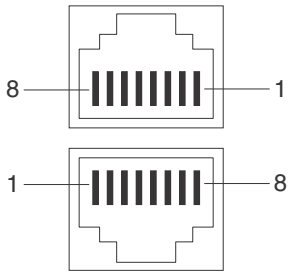



**FIGURE 38** Pin assignment and signalling for 10 or 100BaseTX and 1000BaseT ports




| | | | |
|---|---|---|---|
| 1 | RD+ | 1 | RD+ |
| 2 | RD- | 2 | RD- |
| 3 | TD+ | 3 | TD+ |
| 4 | Not used | 4 | CMT |
| 5 | Not used | 5 | CMT |
| 6 | TD- | 6 | TD- |
| 7 | Not used | 7 | CMT |
| 8 | Not used | 8 | CMT |

## Cable specifications

Table 23 lists the cable specifications for the cables used with the 10/100, Gbps and 10 Gbps Ethernet ports.

**NOTE**
Cable installation and network configuration will affect overall transmission capability. The numbers shown in Table 23 represent the accepted recommendations of the various standards. For network-specific recommendations, consult your local Brocade reseller or system engineer.

**TABLE 23** Cable specifications

| | Cable type | Connector type | Core diameter (microns) | Modal bandwidth (MHz km) or Wavelength (nm) | Range (meters) |
|---|---|---|---|---|---|
| 1000Base-BX-D | Single-mode Fiber (SMF) | LC connector for SFP module | 9 | 1490 nm | 2 – 10000 (10km) |
| 1000Base-BX-U | SMF | LC connector for SFP module | 9 | 1310 nm | 2 – 10000 (10km) |
| 1000Base-LHA | SMF | LC connector for SFP module | 9 | 1550 nm | 2 – 70000 (70km) |

**TABLE 23** Cable specifications (Continued)

| | Cable type | Connector type | Core diameter (microns) | Modal bandwidth (MHz km) or Wavelength (nm) | Range (meters) |
|---|---|---|---|---|---|
| 1000Base-LHB | SMF | LC connector for SFP module | 9 | 1550 nm | 2 – 120000 (120km) |
| 1000Base-LX | Multi-mode Fiber (MMF) | LC connector for SFP module | 62.5 | 500 | 2 – 550 |
| | MMF | | 50 | 400 | 2 – 550 |
| | MMF | | 50 | 500 | 2 – 550 |
| | SMF | | 9 | 1300 nm | 2 – 10000 |
| 1000Base-SX | MMF | LC connector for SFP module | 62.5/125 | 200 | .5 – 275 |
| | MMF | | 62.5/125 | 500 | .5 – 550 |
| | MMF | | 50/125 | 900 | .5 – 595 |
| | MMF | | 50/125 | 1500 | .5 – 740 |
| | MMF | | 50/125 | 2000 | .5 – 860 |
| 1000Base-SX 2 | MMF | LC connector for SFP module | 62.5 | 500 | up to 2000 (2 km) |
| 1000Base-T | Copper | RJ-45 jack for standard unshielded twisted pair (UTP or Category 5) | n/a | n/a | up to 100 meters |
| 100Base-BX 100Bse-BX-D | SMF | LC connector for SFP module | 9 | 1310/1490 | 10000 (10 km) |
| 100Base-FX | MMF | LC connector for SFP module | 62.5 | 500 | up to 2000 (2 km) |
| 100Base-FX-IR | MMF | SC | 62.5 | 125 | 2 km (1.24 miles) |
| 100Base-FX-LR | SMF | SC | 9 | 125 | 20 km (12.43 miles) |
| 100Base-TX | Copper | RJ-45 jack for standard unshielded twisted pair (UTP or Category 5) | n/a | n/a | up to 100 meters |
| 10GBase-CX4 | 4X Twinax | IB4X | n/a | n/a | 15 m (49.21 ft.) |
| 10GBase-ER | SMF | LC connector for XFP module | 9 | 1550 nm | up to 40000 (40 km) |
| 10GBase-LR | SMF | LC connector for XFP module | 9 | 1310 nm | 2 – 10000 (10km) |
| 10GBase-SR | MMF | LC connector for XFP module | 62.5/125 | 160 | 2 – 26 |
| | MMF | | 62.5/125 | 200 | 2 – 33 |
| | MMF | | 50/125 | 400 | 2 – 66 |
| | MMF | | 50/125 | 500 | 2 – 82 |
| | MMF | | 50/125 | 2000 | 2 – 300 |

**TABLE 23** Cable specifications (Continued)

| | Cable type | Connector type | Core diameter (microns) | Modal bandwidth (MHz km) or Wavelength (nm) | Range (meters) |
|---|---|---|---|---|---|
| 10GBase-XFP | MMF | LC connector for XFP module | 62.5 | 1310 nm | 200 m |
| | MMF | | 50 | 160 or 200 and 400 or 500 | 200 m |
| 10GBase-ZR | SMF | LC connector for XFP module | 9 | 1550 nm | up to 80000 (80 km) |
| 10GBase-ZRD | SMF | LC connector for XFP module | 9 | 1530.33 – 1561.42 nm | up to 80000 (80 km) |

## AC power supply

The FastIron LS and LS-STK devicees include an integrated AC power supply with a standard IEC type (IEC320) input connector, that operates at 85 VAC to 254 VAC input, universal or wide input.

### *AC power specifications*

**TABLE 24** AC power specifications

| Property | FLS624 | FLS648 |
|---|---|---|
| Input voltage range | 100 - 240 VAC | 100 - 240 VAC |
| Input current | < 3 Amps | < 3 Amps |
| Inrush current | < 8.5 Amps peak maximum | < 12 Amps peak maximum |
| Power consumption (without modules) | 65 W | 85 W |
| Power consumption (with all modules) | 105 W | 120 W |
| Max output power | 156 W | 156 W |

## Power cables

All FastIron devices ship with US-compatible power cables unless otherwise specified at the time of order. United Kingdom- and European-compatible power cables are also available.

# Redundant power supply specifications

The optional Redundant Power Supply (RPS2-EIF) can supply backup power to four attached devicees (FLS627, FLS648, FLS624-STK and FLS648-STK) in the event of an AC power loss or the failure of an internal power supply.

For more information, see “Installing a redundant power supply” on page 17.

## Key features

Key features of the RPS2-EIF power supply include:

- Operating 90 VAC to 254 VAC input, universal or wide input
- Rated 100 to 240 V ~ 50 or 60 Hz
- 644 Watts of total output power

## Physical dimensions and weight

Table 25 lists the dimensions and weight of the RPS device.

**TABLE 25** Physical dimensions and weight of the redundant power supply

| Power Supply | Dimensions | Weight |
|---|---|---|
| RPS2-EIF | 1.69 in (H) x 17.32 in (W) x 12.72 in (D)<br>4.3 cm (H) x 44.0 cm (W) x 32.3 cm (D) | 5.5 kg. (12.1 lb) |

## Input connector specifications

The following specifications apply to the RPS2-EIF power supply input connector:

- IEC socket 216C743-07
- C14 type: UL File No. E29179
- CSA File No. LR19980

## Regulatory compliance

This section contains regulatory standards for Brocade power supplies.

### *Electromagnetic compatibility (EMC) and immunity standards*

Brocade power supplies comply with the conducted and radiated test and immunity standards as listed in Table 26. EMC standards are within a 6 dB minimum margin.

**TABLE 26** EMC and Immunity standards for power supplies

| Power Supply | EMC standards | Immunity standards |
|---|---|---|
| RPS2-EIF | • ICES-003, Electromagnetic Emission<br>• FCC Part 15 Class A<br>• EN 55022 or CISPR 22 Class A<br>• VCCI Class A<br>• EN 61000-3-2, Power Line Harmonics<br>• EN 61000-3-3, Voltage Fluctuation & Flicker<br>• EN 61000-6-3, Electromagnetic Compatibility, Generic Standard<br>• AS or NZS CISPR 22, Electromagnetic Compatibility<br>• Harmonic Current Emissions (Class A) - EN61000-3-2, with Amendment 14 (1999) | • EN 61000-6-1, Electromagnetic Compatibility, Generic Standard<br>• EN 55024, Information Technology equipment - Immunity Characteristics |

### *FCC CFR 47 Part 15 warning*

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Changes or modifications made to this device which are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### *CISPR 22 CLASS A warning*

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

### *VCCI*

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

### *Safety agency approvals and certifications*

FastIron LS power supplies comply with the following safety standards:

- UL or cUL per CAN or CSA C22.2 No. 60950-1-03 and UL 60950-1
- CE per EN 60950-1:2001
- TUV per EN 60950-1:2001 or IEC 60950-1:2001

### *Safety warnings*

Power supplies are marked with an electrical hazard label and with the safety warnings shown in Table 27.

**TABLE 27** Safety warning labels on power supplies

| | |
|---|---|
| **ATTENZIONE** | Non aprire. Rivolgersi a personale qualificado. |
| **CUIDADO** | Partes adentro no reparables por el operador. Refiera reparo a personal autorizado. |
| **ATTENTION** | Entretien et répartions internes ne sont autorisés qu'au personnel technique qualifié. |
| **Gefahr** | Zugang zur Bedienung nicht erförderlich. Wartung nur durch qualifiziertes Personal. |
| **NOTE:** No operator serviceable parts inside. Refer servicing to qualified personnel. | |

### *Environmental considerations*

**TABLE 28** Environmental considerations for power supplies

| Property | RPS2-EIF |
|---|---|
| Operating temperature | 0 to 50 Deg. C, 32 to 121.9 Deg. F |
| Operating relative humidity | 5 – 95%, non-condensing |
| Operating altitude | up to 6,600 feet above sea level |
| Storage temperature | -40 to 158 Deg. F, -40 to +70 Deg. C |
| Storage altitude | up to 15,000 feet above sea level |
| Cooling | internal fan, 28 mm, 9500rpm |

### *Mean Time Before Failure*

Table 29 provides the initial MTBF results for the RPS2-EIF power supply.

**TABLE 29** Mean Time Before Failure Specifications

| Platform | Temperature | System Failure Rate | System MTBF |
|---|---|---|---|
| RPS2-EIF | 25 Deg. C (76.9 Deg. F) | 7343.584745 | 136,173 |
| 50 Deg. C (121.9 Deg. F) | 17,129.130581 | 58,380 | |

### *Electrical input specifications*

Table 30 lists the electrical input specifications for the power supply.

**TABLE 30** Input specifications for power supplies

| Property | RPS2-EIF |
|---|---|
| Rated input voltage range | 100 - 240 VAC |
| Input current | < 10 Amps |
| Inrush current | 60 A |

# 7 Redundant power supply specifications

Appendix

# Regulatory Statements A

## USA (FCC CFR 47 Part 15 Warning)

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**CAUTION**

**Changes or modifications made to this device which are not expressly approved by Brocade could void the user's authority to operate the equipment.**

## Industry Canada statement

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Engish Translation of above statement

This Class A digital apparatus complies with Canadian ICES-003.

## Europe and Australia (CISPR 22 Class A Warning)

This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

## Japan (VCCI)

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

**English translation of above statement**

This is Class A product based on the standard of the Voluntary Control Council For Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

# Japan power cord

**注意 –** 添付の電源コードを他の装置や用途に使用しない
添付の電源コードは本装置に接続し、使用することを目的として設計され、その安全性が確認されているものです。決して他の装置や用途に使用しないでください。火災や感電の原因となる恐れがあります。

**English translation of above statement**

ATTENTION: Never use the power cord packed with your equipment for other products.

# Korea

A 급 기기 ( 업무용 방송통신기기 ): 이 기기는 업무용 (A 급 ) 으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 , 가정외의 지역에서 사용하는 것을 목적으로 합니다 .

Translation: Class A device (Broadcasting Communication Device for Office Use): This device obtained EMC registration for office use (Class A), and may be used in places other than home. Sellers and/or users need to take note of this.

# Russia

Сертификат Соответствия в "Системе сертификации в области связи" № О
срок действия: с 29 октября 2009 г. до 29 октября 2012 г.

**English translation of above statement**

Certificate of Conformity in "Certification System in the field of telecommunications" # ОС-2-СПД-0560, validity from the 29 of October 2009 to the 29 of October 2012.

# Regulatory compliance

Table 31 lists the Electromagnetic Compatibility (EMC), Immunity standards, and safety agency approvals for the FastIron family of devicees.

**TABLE 31** Regulatory Compliance and Safety Approvals

| Certifications |
|---|
| Emissions:<br>• ICES-003, Electromagnetic Emission<br>• FCC Part 15 Class A<br>• EN 55022/CISPR 22 Class A<br>• VCCI Class A<br>• EN 61000-3-2, Power Line Harmonics<br>• EN 61000-3-3, Voltage Fluctuation & Flicker<br>• EN 61000-6-3, Electromagnetic Compatibility, Generic Standard<br>• AS or NZS CISPR 22, Electromagnetic Compatibility<br>Immunity:<br>• EN 61000-6-1, Electromagnetic Compatibility, Generic Standard<br>• EN 55024, Information Technology equipment - Immunity Characteristics<br>Safety:<br>• BI-NAT CSA 60950-1-03/UL 60950-1<br>• EN 60950-1:2001<br>• IEC 60950-1:2001 |

# A Regulatory compliance

Appendix

# Caution and Danger Notices

B

The caution and danger notices that appear in this manual are listed below in English, German, French, and Spanish.

## Caution

A caution calls your attention to a possible hazard that can damage equipment.

“Vorsicht” weist auf die Gefahr einer möglichen Beschädigung des Gerätes in.

Une mise en garde attire votre attention sur un risque possible d'endommagement de l'équipement. Ci-dessous, vous trouverez les mises en garde utilisées dans ce manuel.

Un mensaje de precaución le advierte sobre un posible peligro que pueda dañar el equipo. Las siguientes son precauciones utilizadas en este manual.

| | |
|---|---|
| **CAUTION** | The FLS power supply is designed exclusively for use with the FLS devices. The power supply produces extensive power to support 802.3af applications. Installing the power supply in a device other than the FLS will cause extensive damage to your equipment. |
| **VORSICHT** | Das Netzgerät FLS ist für den ausschließlichen Gebrauch in Model FLS konzipiert. Installation des Netzgerätes in anderen Geräten als FLS verursacht erheblichen Schaden an Ihrer Anlage. |
| **MISE EN GARDE** | Le bloc d'alimentation FLS est conçu exclusivement pour être utilisé avec les dispositifs FLS. Le bloc d'alimentation produit une alimentation très importante pour prendre en charge les applications 802.3af. Si vous l'installez dans un dispositif autre que les FLS, il endommagera gravement votre équipement. |
| **PRECAUCIÓN** | El suministro de corriente alterna del FLS está diseñado exclusivamente para uso con los dispositivos FLS. El suministro de corriente produce suficiente energía para abastecer a las aplicaciones 802.3af. Si se instala el suministro de corriente en un dispositivo que no sea el FLS, se producirán daños de consideración al equipo. |

| | |
|---|---|
| **CAUTION** | Do not install the device in an environment where the operating ambient temperature might exceed 40° C (104° F). |
| **VORSICHT** | Das Gerät darf nicht in einer Umgebung mit einer Umgebungsbetriebstemperatur von über 40° C (104° F) installiert werden. |
| **MISE EN GARDE** | N'installez pas le dispositif dans un environnement où la température d'exploitation ambiante risque de dépasser 40° C (104° F). |
| **PRECAUCIÓN** | No instale el instrumento en un entorno en el que la temperatura ambiente de operación pueda exceder los 40°C (104°F). |

| | |
|---|---|
| **CAUTION** | Make sure the air flow around the front, sides, and back of the device is not restricted. |
| **VORSICHT** | Stellen Sie sicher, dass an der Vorderseite, den Seiten und an der Rückseite der Luftstrom nicht behindert wird. |
| **MISE EN GARDE** | Vérifiez que rien ne restreint la circulation d'air devant, derrière et sur les côtés du dispositif et qu'elle peut se faire librement. |
| **PRECAUCIÓN** | Asegúrese de que el flujo de aire en las inmediaciones de las partes anterior, laterales y posterior del instrumento no esté restringido. |

| | |
|---|---|
| **CAUTION** | Use a separate branch circuit for each AC power cable, which provides redundancy in case one of the circuits fails. |
| **VORSICHT** | Es empfiehlt sich die Installation eines separaten Stromkreiszweiges für jede Wechselstrom-Elektroschnur als Redundanz im Fall des Ausfalls eines Stromkreises. |
| **MISE EN GARDE** | Utilisez un circuit de dérivation différent pour chaque cordon d'alimentation C.A. Ainsi, il y aura un circuit redondant en cas de panne d'un des circuits. |
| **PRECAUCIÓN** | Use un circuito derivado separado para cada cordón de alimentación de CA, con lo que se proporcionará redundancia en caso de que uno de los circuitos falle. |

| | |
|---|---|
| **CAUTION** | Ensure that the device does not overload the power circuits, wiring, and over-current protection. To determine the possibility of overloading the supply circuits, add the ampere (amp) ratings of all devices installed on the same circuit as the device. Compare this total with the rating limit for the circuit. The maximum ampere ratings are usually printed on the devices near the input power connectors. |
| **VORSICHT** | Stromkreise, Verdrahtung und Überlastschutz dürfen nicht durch das Gerät überbelastet werden. Addieren Sie die Nennstromleistung (in Ampere) aller Geräte, die am selben Stromkreis wie das Gerät installiert sind. Somit können Sie feststellen, ob die Gefahr einer Überbelastung der Versorgungsstromkreise vorliegt. Vergleichen Sie diese Summe mit der Nennstromgrenze des Stromkreises. Die Höchstnennströme (in Ampere) stehen normalerweise auf der Geräterückseite neben den Eingangsstromanschlüssen. |
| **MISE EN GARDE** | Assurez-vous que le dispositif ne risque pas de surcharger les circuits d'alimentation, le câblage et la protection de surintensité. Pour déterminer le risque de surcharge des circuits d'alimentation, additionnez l'intensité nominale (ampères) de tous les dispositifs installés sur le même circuit que le dispositif en question. Comparez alors ce total avec la limite de charge du circuit. L'intensité nominale maximum en ampères est généralement imprimée sur chaque dispositif près des connecteurs d'entrée d'alimentation. |
| **PRECAUCIÓN** | Verifique que el instrumento no sobrecargue los circuitos de corriente, el cableado y la protección para sobrecargas. Para determinar la posibilidad de sobrecarga en los circuitos de suministros, añada las capacidades nominales de corriente (amp) de todos los instrumentos instalados en el mismo circuito que el instrumento. Compare esta suma con el límite nominal para el circuito. Las capacidades nominales de corriente máximas están generalmente impresas en los instrumentos, cerca de los conectores de corriente de entrada. |

| | |
|---|---|
| **CAUTION** | All devices with DC power supplies are intended for installation in restricted access areas only. A restricted access area is where access can be gained only by service personnel through the use of a special tool, lock and key, or other means of security, and is controlled by the authority responsible for the location. |
| **VORSICHT** | Alle Geräte mit DC-Netzteil sind nur für die Installation in Bereichen mit beschränktem Zugang gedacht. Ein Bereich mit beschränktem Zugang ist ein Bereich, zu dem nur Wartungspersonal mit Spezialwerkzeug, Schlüssel oder anderen Sicherheitsvorrichtungen Zugang hat. Dieser Zugang wird von für den Bereich zuständigen Personen überwacht. |
| **MISE EN GARDE** | Tous les dispositifs avec bloc d'alimentation C.C. sont conçus pour l'installation dans des zones à accès réglementé uniquement. Une zone à accès réglementé est une zone dont l'accès n'est possible qu'au personnel de service utilisant un verrou, une clé ou un outil spécial, ou d'autres moyens de sécurité, et qui est contrôlée par les autorités responsables du site. |
| **PRECAUCIÓN** | Todos los instrumentos con suministros de corriente continua han sido diseñados únicamente para instalación en áreas restringidas. Se entiende como área de acceso restringido un lugar al que solo puede acceder personal de servicio mediante el uso de una herramienta especial, llave y cerrojo u otro medio de seguridad similar, y que esté controlado por la autoridad responsable de esa ubicación. |

| | |
|---|---|
| **CAUTION** | For a DC system (DC power supply part number RPSDC-FGS), use a grounding wire of at least 10 American Wire Gauge (AWG). The 10 AWG wire should be attached to an agency-approved crimp connector, crimped with the proper tool. |
| **VORSICHT** | Für ein Gleichstromsystem (Gleichstromnetzteile mit der Teilenr RPSDC-FGS) ist ein Erdungsdraht (wenigstens 10 AWG) erforderlich. Der 10 AWG-Draht sollte an einen behördlich genehmigten Crimpverbinder angebracht werden, der mit einem ordnungsgemäßen Werkzeug gecrimpt wurde. |
| **MISE EN GARDE** | Pour les systèmes C.C. (références du bloc d'alimentation C.C. RPSDC-FGS), utilisez un fil de mise à la terre d'au moins 10 AWG (American Wire Gauge). Ce fil de 10 AWG doit être relié à un connecteur à sertissage homologué, serti avec l'outil approprié. Le connecteur à sertissage doit permettre la sécurisation aux deux vis de borne de terre sur le boîtier. |
| **PRECAUCIÓN** | Para un sistema de CC (suministro de corriente continua con No. de referencia RPSDC-FGS), utilice un cable de conexión a tierra de calibre de cable norteamericano (AWG) número 10. El cable 10 AWG deberá acoplarse a un conector engarzado aprobado, y engarzado con la herramienta apropiada. |

| | |
|---|---|
| **CAUTION** | For the DC input circuit to the system (DC power supply part number RPSDC-FGS), make sure there is a 30 amp circuit breaker, minimum -48Vdc, double pole, on the input to the terminal block. The input wiring for connection to the product should be copper wire, 10 AWG, marked VW-1, and rated minimum 90 degrees celcius. |
| **VORSICHT** | Für den Eingangs-Gleichstromkreis zum System (Gleichstromnetzteile mit der Teilenr. RPSDC-FGS) ist ein 30 A (Minimum), -48 V DC, doppelpolig, am Eingang zur Reihenklemme zu installieren. Bei der Eingangsverdrahtung zum Anschluss des Produkts sollte es sich um einen 10 AWG-Kupferdraht (VW-1) und einer Mindestnenntemperatur von 32° handeln. |
| **MISE EN GARDE** | Pour le circuit d'alimentation C.C du système (références du bloc d'alimentation C.C. RPSDC-FGS), assurez-vous de la présence d'un disjoncteur de 30 ampères, minimum – 48 V C.C., double coupure, sur l'entrée vers le bloc d'alimentation. Les câbles d'alimentation pour le produit doivent être en fils de cuivre, 10 AWG (American Wire Gauge), marqués VW-1 et classés 90 degrés Celsius. |
| **PRECAUCIÓN** | Para el circuito de entrada de CC al sistema (suministro de corriente continua con No. de referencia RPSDC-FGS), verifique que existe un cortacircuitos catalogado de 30 amperios, como mínimo, -48 VCC, bipolar, en la entrada al bloque terminal. El cableado de entrada para la conexión al producto deberá ser de cable de cobre catalogado, 10 AWG, marcado con VW-1, y tener una capacidad nominal mínima para 90 grados centígrados. |

| | |
|---|---|
| **CAUTION** | Use the **erase startup-config** command only for new systems. If you enter this command on a system you have already configured, the command erases the configuration. If you accidentally do erase the configuration on a configured system, enter the write memory command to save the running configuration to the startup-config file. |
| **VORSICHT** | Verwenden Sie den Befehl "**Erase startup-config**" (Löschen Startup-Konfig) nur für neue Systeme. Wenn Sie diesen Befehl in ein bereits konfiguriertes System eingeben, löscht der Befehl die Konfiguration. Falls Sie aus Versehen die Konfiguration eines bereits konfigurierten Systems löschen, geben Sie den Befehl "Write Memory" (Speicher schreiben) ein, um die laufende Konfiguration in der Startup-Konfig-Datei zu speichern. |
| **MISE EN GARDE** | N'utilisez la commande **erase startup-config** que pour les nouveaux systèmes. Si vous entrez cette commande sur un système que vous avez déjà configuré, elle efface la configuration. Si vous effacez la configuration par accident sur un système configuré, entrez la commande write memory pour enregistrer la configuration actuelle dans le fichier startup-config. |
| **PRECAUCIÓN** | Use el comando **erase startup-config** (borrar configuración de inicio) para sistemas nuevos solamente. Si usted introduce este comando en un sistema que ya ha configurado, el comando borrará la configuración. Si usted borra accidentalmente la configuración en un sistema ya configurado, introduzca el comando write memory (escribir memoria) para guardar la configuración en ejecución en el archivo startup-config. |

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| **CAUTION** | Never leave tools inside the device. |
| **VORSICHT** | Lassen Sie keine Werkzeuge im Chassis zurück. |
| **MISE EN GARDE** | Ne laissez jamais d'outils à l'intérieur du châssis. |
| **PRECAUCIÓN** | No deje nunca herramientas en el interior del chasis. |

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| **CAUTION** | If you do not install a module in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat. |
| **VORSICHT** | Falls kein Modul im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß. |
| **MISE EN GARDE** | Si vous n'installez pas de module dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera. |
| **PRECAUCIÓN** | Si no instala un módulo en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento. |

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| **CAUTION** | To avoid high voltage shock, do not open the device while the power is on. |
| **VORSICHT** | Zur Vermeidung eines Elektroschocks durch Hochspannung darf das Gerät im eingeschalteten Zustand nicht geöffnet werden. |
| **MISE EN GARDE** | Pour éviter tout risque d'électrocution, ne pas ouvrir cet appareil lorsqu'il est sous tension. |
| **PRECAUCIÓN** | Para evitar la electrocución por alto voltaje, no abra el dispositivo mientras esté conectado a la corriente eléctrica. |

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| **CAUTION** | Remove the power cable from a power supply before you install it in or remove it from the device. Otherwise, the power supply or the device could be damaged as a result. (The device can be running while a power supply is being installed or removed, but the power supply itself should not be connected to a power source.) |
| **VORSICHT** | Vor dem Installieren einer Stromversorgung im Gerät bzw. vor dem Herausnehmen einer Stromversorgung aus dem Gerät das Netzkabel von der Stromversorgung trennen. Geschieht das nicht, kann dies zur Beschädigung der Stromversorgung bzw. des Geräts führen. (Die Stromversorgung kann im laufenden Gerätebetrieb herausgenommen bzw. installiert werden, sollte dabei aber nicht an einer Stromquelle angeschlossen sein.) |
| **MISE EN GARDE** | Débrancher le cordon secteur de l'alimentation avant de le la raccorder à l'équipement ou de le la déconnecter de celui-ci, faute de quoi le circuit d'alimentation de l'équipement pourrait être endommagé. (L'équipement peut fonctionner pendant la dépose ou le remplacement d'une alimentation électrique, mais il est important que celle-ci ne soit pas raccordée au secteur.) |
| **PRECAUCIÓN** | Desenchufe el cable eléctrico de una fuente de alimentación antes de proceder a montarla o a desmontarla del dispositivo. En caso contrario, la fuente de alimentación o el dispositivo podrían sufrir daños. (Aunque el dispositivo podrá mantenerse en funcionamiento durante la instalación o desinstalación de la fuente de alimentación, dicha fuente de alimentación no deberá estar conectada a una toma de corriente). |

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| **CAUTION** | Make sure you insert the EEPROM so that lead pin 1 goes into the correct hole as shown in the appropriate illustrations. If you accidentally insert the EEPROM backwards, the device will not work and may be damaged when you power it on. |
| **VORSICHT** | Beim Einsatz des EEPROM darauf achten, dass Anschlussstift 1 gemäß den entsprechenden Abbildungen in das richtige Loch eingeführt wird. Wird das EEPROM aus Versehen verkehrt herum eingesetzt, funktioniert das Gerät nicht und kann beim Einschalten beschädigt werden. |
| **MISE EN GARDE** | Veiller à insérer l'EEPROM de façon à placer la broche 1 dans l'orifice correct (voir les illustrations appropriées). En cas d'inversion de l'EEPROM lors de son insertion, l'équipement ne fonctionnera pas et risque d'être endommagé à la mise sous tension. |
| **PRECAUCIÓN** | Asegúrese de introducir la EEPROM de modo que el pin 1 del cable quede insertado en el orificio correcto, tal y como se muestra en las ilustraciones correspondientes. Si accidentalmente introdujera la EEPROM al revés, el dispositivo no funcionaría y podría dañarse al encenderlo. |

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| **CAUTION** | Do not push too hard. If the EEPROM does not readily go into the socket, stop pushing and verify that the lead pins are straight and aligned over the holes. Straighten any crooked pins, then try again. |
| **VORSICHT** | Nicht zu fest drücken. Wenn sich das EEPROM nicht leicht einführen lässt, nicht drücken, sondern überprüfen, ob die Anschlussstifte gerade und über den Löchern ausgerichtet sind. Alle nicht gerade ausgerichteten Stifte gerade ausrichten und dann den Vorgang wiederholen. |
| **MISE EN GARDE** | Ne pas appuyer excessivement sur l'EEPROM. Si elle ne s'insère pas aisément dans son emplacement, vérifier immédiatement que les broches de guidage sont bien droites et alignées en face des orifices correspondants. Si nécessaire, redresser toute broche tordue avant d'essayer à nouveau. |
| **PRECAUCIÓN** | No ejerza demasiada presión. Si la EEPROM no entra fácilmente en la toma, deje de presionar y compruebe que los pines del cable estén rectos y alineados sobre los orificios. Rectifique los pines torcidos e inténtelo de nuevo. |

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| **CAUTION** | If you do not install a module in a slot, you must keep the slot panel in place. If you run the device with an uncovered slot, the system will overheat. |
| **VORSICHT** | Falls kein Modul im Steckplatz installiert wird, muss die Steckplatztafel angebracht werden. Wenn ein Steckplatz nicht abgedeckt wird, läuft das System heiß. |
| **MISE EN GARDE** | Si vous n'installez pas de module dans un slot, vous devez laisser le panneau du slot en place. Si vous faites fonctionner le châssis avec un slot découvert, le système surchauffera. |
| **PRECAUCIÓN** | Si no instala un módulo en la ranura, deberá mantener el panel de ranuras en su lugar. Si pone en funcionamiento el chasis con una ranura descubierta, el sistema sufrirá sobrecalentamiento. |

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| **CAUTION** | Changes or modifications made to this device that are not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. |
| **VORSICHT** | Falls dieses Gerät verändert oder modifiziert wird, ohne die ausdrückliche Genehmigung der für die Einhaltung der Anforderungen verantwortlichen Partei einzuholen, kann dem Benutzer der weitere Betrieb des Gerätes untersagt werden. |
| **MISE EN GARDE** | Les éventuelles modifications apportées à cet équipement sans avoir été expressément approuvées par la partie responsable d'en évaluer la conformité sont susceptibles d'annuler le droit de l'utilisateur à utiliser cet équipement. |
| **PRECAUCIÓN** | Si se realizan cambios o modificaciones en este dispositivo sin la autorización expresa de la parte responsable del cumplimiento de las normas, la licencia del usuario para operar este equipo puede quedar anulada. |

# Danger

A danger calls your attention to a possible hazard that can cause injury or death. The following are the danger notices used in this manual.

"Gefahr" weist auf eine mögliche Gefährdung hin, die zu Verletzungen oder Tod führen können. Sie finden die folgenden Warnhinweise in diesem Handbuch:

Un danger attire votre attention sur un risque possible de blessure ou de décès. Ci-dessous, vous trouverez les dangers utilisés dans ce manuel.

Una advertencia le llama la atención sobre cualquier peligro posible que pueda ocasionar daños personales o la muerte. A continuación se dan las advertencias utilizadas en este manual.

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| **DANGER** | The procedures in this manual are for qualified service personnel. |
| **GEFAHR** | Die Verfahren in diesem Handbuch sind nur für qualifiziertes Wartungspersonal gedacht. |
| **DANGER** | Les procédures décrites dans ce manuel doivent être effectuées par le personnel de service qualifié uniquement. |
| **PELIGRO** | Los procedimientos de este manual se han hecho para personal de servicio cualificado. |

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| **DANGER** | All fiber optic interfaces use Class 1 lasers. |
| **GEFAHR** | Alle Glasfaser-Schnittstellen verwenden Laser der Klasse 1. |
| **DANGER** | Toutes les interfaces en fibres optiques utilisent des lasers de classe 1. |
| **PELIGRO** | Todas las interfaces de fibra óptica utilizan láser de clase 1. |

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| **DANGER** | Make sure the rack or cabinet housing the device is adequately secured to prevent it from becoming unstable or falling over. |
| **GEFAHR** | Stellen Sie sicher, dass das Gestell oder der Schrank für die Unterbringung des Geräts auf angemessene Weise gesichert ist, so dass das Gestell oder der Schrank nicht wackeln oder umfallen kann. |
| **DANGER** | Vérifiez que le bâti ou le support abritant le dispositif est bien fixé afin qu'il ne devienne pas instable ou qu'il ne risque pas de tomber. |
| **PELIGRO** | Verifique que el bastidor o armario que alberga el instrumento está asegurado correctamente para evitar que pueda hacerse inestable o que caiga. |

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| **DANGER** | Mount the devices you install in a rack or cabinet as low as possible. Place the heaviest device at the bottom and progressively place lighter devices above. |
| **GEFAHR** | Montieren Sie die Geräte im Gestell oder Schrank so tief wie möglich. Platzieren Sie das schwerste Gerät ganz unten, während leichtere Geräte je nach Gewicht (je schwerer desto tiefer) darüber untergebracht werden. |
| **DANGER** | Montez les dispositifs que vous installez dans un bâti ou support aussi bas que possible. Placez le dispositif le plus lourd en bas et le plus léger en haut, en plaçant tous les dispositifs progressivement de bas en haut du plus lourd au plus léger. |
| **PELIGRO** | Monte los instrumentos que instale en un bastidor o armario lo más bajos posible. Ponga el instrumento más pesado en la parte inferior y los instrumentos progresivamente más livianos más arriba. |

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| **DANGER** | Disconnect the power cable from all power sources to completely remove power from the device. |
| **GEFAHR** | Ziehen Sie das Stromkabel aus allen Stromquellen, um sicherzustellen, dass dem Gerät kein Strom zugeführt wird. |
| **DANGER** | Débranchez le cordon d'alimentation de toutes les sources d'alimentation pour couper complètement l'alimentation du dispositif. |
| **PELIGRO** | Para desconectar completamente la corriente del instrumento, desconecte el cordón de corriente de todas las fuentes de corriente. |

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| **DANGER** | If the installation requires a different power cable than the one supplied with the device, make sure you use a power cable displaying the mark of the safety agency that defines the regulations for power cords in your country. The mark is your assurance that the power cable can be used safely with the device. |
| **GEFAHR** | Falls für die Installation ein anderes Stromkabel erforderlich ist (wenn das mit dem Gerät gelieferte Kabel nicht passt), müssen Sie sicherstellen, dass Sie ein Stromkabel mit dem Siegel einer Sicherheitsbehörde verwenden, die für die Zertifizierung von Stromkabeln in Ihrem Land zuständig ist. Das Siegel ist Ihre Garantie, dass das Stromkabel sicher mit Ihrem Gerät verwendet werden kann. |
| **DANGER** | Si l'installation nécessite un cordon d'alimentation autre que celui fourni avec le dispositif, assurez-vous d'utiliser un cordon d'alimentation portant la marque de l'organisation responsable de la sécurité qui définit les normes et régulations pour les cordons d'alimentation dans votre pays. Cette marque vous assure que vous pouvez utiliser le cordon d'alimentation avec le dispositif en toute sécurité. |
| **PELIGRO** | Si la instalación requiere un cordón de corriente distinto al que se ha suministrado con el instrumento, verifique que usa un cordón de corriente que venga con la marca de la agencia de seguridad que defina las regulaciones para cordones de corriente en su país. Esta marca será su garantía de que el cordón de corriente puede ser utilizado con seguridad con el instrumento. |

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| **DANGER** | For safety reasons, the ESD wrist strap should contain a series 1 meg ohm resistor. |
| **GEFAHR** | Aus Sicherheitsgründen sollte ein EGB-Armband zum Schutz von elektronischen gefährdeten Bauelementen mit einem 1 Megaohm-Reihenwiderstand ausgestattet sein. |
| **DANGER** | Pour des raisons de sécurité, la dragonne ESD doit contenir une résistance de série 1 méga ohm. |
| **PELIGRO** | Por razones de seguridad, la correa de muñeca ESD deberá contener un resistor en serie de 1 mega ohmio. |

B Danger